ACCREDITED CITATIONS

IN

RISTORO D'AREZZO'S COMPOSIZIONE DEL MONDO

A STUDY OF SOURCES

DISSERTATION

Submitted to the Board of University Studies

of the

Johns Hopkins University

in Conformity with the Requirements

for the

Degree of Doctor of Philosophy

by

HERBERT DOUGLAS AUSTIN

MAY 1911

Digitized by the Internet Archive
in 2026

https://archive.org/details/IA41548215_0009

ACCREDITED CITATIONS

IN

RISTORO D'AREZZO'S COMPOSIZIONE DEL MONDO

A STUDY OF SOURCES

DISSERTATION

Submitted to the Board of University Studies

of the

Johns Hopkins University

in Conformity with the Requirements

for the

Degree of Doctor of Philosophy

by

HERBERT DOUGLAS AUSTIN

MAY 1911

ACAD. UGD. BAT. BIBL.

Stabilimento Tipografico DOTTOR GUIDO MOMO - Via Riberi, 6, Torino.

Accredited Citations

in

Ristoro d'Arezzo's "Composizione del Mondo,,

A STUDY OF SOURCES

INTRODUCTION.

The purpose of this study is to prepare the way for the further determination of the sources of the *Composizione del Mondo* of Ristoro d'Arezzo; a task worth accomplishing both for the intrinsic interest of the subject, and as a contribution to the general history of scientific thought in medieval Italy.

For this I have chosen the obvious method in the treatment of what is practically a virgin field: to examine each citation which is accredited by the author to a definitely named source; to seek to locate the original source; to quote it, with as much elucidation and comment as may seem desirable, from a form of the text as near as possible to that actually used by Ristoro; and by such means to establish more or less definitely a series of facts, as a guide for subsequent and broader studies in the same field.

Adherence to this method was necessary, if definite progress was to be made; but it has inevitably carried with it some disadvantages: certain tentative hypotheses might have been confirmed or disproved, certain doubts might have been removed, much new light might have been shed, in the case of the results herein attained or indicated, if the wider extent of Ristoro's indebtedness had been studied. When that shall have been done, the present study may need revision. But all of these disadvantages belong to the nature of the task; and it will doubtless be found, on the other hand, that some of the results herein attained are definitive, and that many are helpful.

Another difficulty, of quite a different order, consists in the fact that, for the works we shall have occasion to consider, there is scarcely a single critical text. This is, after all, of minor importance in the case of Ristoro's sources, since he had access to them, naturally, only in their manuscript form, and we can hardly hope to determine the precise copy he used in each case.

The lack of a critical edition of the *Composizione del Mondo* itself is much more serious. The Riccardian Ms. 2164 is a good and reliable document; but it is not the original, nor is it a perfect copy of the original. Even in the few passages which have been studied intensively in the course of this treatise, several scribal errors are evident [1]. In such cases I have indicated the true reading by comparison with the Chigian Ms., whose main inaccuracies seem to be in the nature of interpolations; and once or twice with the aid of passages which I happened to control from other Mss. In general I have made the Riccardian Ms. 2164 the basis of my text, and, except where otherwise indicated, have reproduced its readings faithfully.

I. Aristotle.

The Riccardian Ms. 2164 adduces Aristotle only once as authority [2], and then for so meagre a citation as to offer but slight ground for a precise determination of the source:

Lib. II, Dist. IV, cap. 1, near end [28 r°, col. 1-2]:

" Et questo moto noi lo kiamamo moto primo. e anco li saui lo " kiamaro cosi. § fuoro tali saui ke de questo asegnauano altro loro " rascione. etale dicea kel cielo semouea ella parte de nanti. etali " dicea kelli andaua ella parte piu nobele. e aristotele disse ello libro " decelo e mundo kelli andaua ella parte dericta. e per questo sepo-

[1] V. p. 5, note 1, and p. 10, note 2.

[2] The three other citations which are found in the Chigian Ms. are absent from Ricc. 2164; and moreover their similarity of diction and the fact that all three refer to the same chapter of the same work indicates clearly that they are of common origin. They therefore be dismissed with some confidence as later interpolations. They are:

Lib. I, cap. 4, near middle: " E questa Galaxia ditermina aristotile nel primo " libro della metaura " [cod. Chig., M. VIII. 169, 15 r°, col. 1, near end, acc. to Narducci, *Comp. del Mondo*, 1859, p. 177].

Lib. II, Distinzione II, cap. 5 [misnumbered in Chig. as Lib. III, cap. 5], toward end: " Et di questa Galasia ditermina il filosofo nel primo libbro dela methura " et pone in prima loppenione degli altri filosafi et poi pone la sua " [cod. Chig., 48 r°, col. 2, end, acc. to Narducci, op. cit., p. 225].

Lib. I, cap. 20, $^3/_4$ through: " Et le cagioni di questi infiamamenti [i. e. meteors] " che sono ingenerati et ingenerano in alto si ditermina il phylosafo nel primo libro " dela metthaura " [cod. Chig., 24 r°, col. 2, end, acc. to Narducci, op. cit., p. 191].

" tarea dire kelli andasse ellato / cum cio sia cosa kelli setroui ello " cielo laparte denanti e quella deretro. ellato ricto ellato manco. " Et dequesto non assegnauano suficiente rascione. enpercio ke [1] ase- " gnaro quella cascione ke facea piu nobele quella parte lao locielo " semouea. Et qualunque corpo animato semoue. uno ideota po- " tarea dire kelli semoue ella parte denanti e ella parte piu nobele " so [sic] noi lo uolgesmo ella parte doriente adarea [sic] locielo eli " segni aretroso. elaparte doriente ne deuentarea. ocidente eli segni " andareano tutti aretroso. esarea in conueniente ".

It is curious to note that Ristoro, quoting Aristotle but once, does so only to contradict him along with other, unnamed, " savi " among whom he unceremoniously includes him. Ristoro's doctrine is that the North Pole is on the right-hand side of the world, not at the bottom as Aristotle taught; and that the starry sphere (to which Ristoro assigns the " moto primo ") moves so that each part of it is going ahead, and that the animals of the Zodiac advance in their natural and seemly direction, head foremost.

Of Aristotle's Περὶ Οὐρανοῦ there existed at Ristoro's time, under the expanded title of *De Coelo et Mundo* [2], at least two Latin translations from Arabic intermediaries. The authorship of one of these versions [3] is variously assigned to Michael Scot (fl. ca. 1230) and to Girard of Cremona († 1187 aet. 73) [4]; Dominicus Gundisalvi, perhaps aided by John of Seville (fl. ca. 1150), is also credited with a translation of this work from the Arabic [5]. The improbability of their having been three separate Latin<Arabic translations of the same treatise is noted by NARDUCCI [6]. And it would be indeed strange that Michael Scot, who is reputed the translator of Averroes' commentary on the *De Coelo et Mundo* [7], should have been ignorant of Girard of Cremona's translation, or knowing of it should have taken the trouble to do it over again. It seems to me at least possible that the following may be the real explanation: The Latin version of the first

[1] The sense here seems to require *non*. The Chigian Ms. has the negative; v. NARDUCCI, op. cit., p. 235. This is not the only case where this Ms., though in many respects unreliable, has preserved an apparently essential link that is missing in Ricc. 2164.

[2] The addition dates back to Ptolemy; v. STEINSCHNEIDER, in *Centralbl. f. Bibliothekswesen*, Beih. 12, 1893, p. 55.

[3] That of which JOURDAIN, *Traductions Latines d'Aristote* (1843), gives a sample in *Specimen* VIII, pp. 407-8.

[4] Cfr. JOURDAIN, op. cit., pp. 127-8; NARDUCCI, op. cit., pp. 73-4, n.; STEINSCHNEIDER, in *Wien Akad. Sitzungsber.* (phil.-hist. Kl.), vol. 149, 1904, IV Abhandl., pp. 16, 17, 55-6; id. in *Centralbl. f. Bibliothekswesen*, Beih. 12, p. 55.

[5] V. JOURDAIN, op. cit., pp. 109-12; but cfr. STEINSCHNEIDER in *Wien Akad.*, loc. cit., pp. 32, 40-1, 43.

[6] Loc. cit.

[7] STEINSCHNEIDER, *Wien Akad.*, loc. cit., pp. 55-6.

type mentioned above (JOURDAIN, *Specimen* VIII) was by Girard of Cremona; the second, nearly contemporary, was by Gundisalvi and John of Seville; Michael Scot's translation ot Averroes' commentary was published with the text of Girard, and then this latter transation was attributed to Michael Scot.

The edition of Aristotle with Averroes' commentaries, in Latin, which I have used [1], contains the Latin<Arabic version of the *De Coelo et Mundo* in the alternate numbered paragraphs; and the Commentary heads each of its own sections with a word or with several words which correspond, within the limits of scribal and typographical error, to the beginning of the paragraph treated; within the body of the comments, however, the passages quoted do not always follow the diction of the Aristotelian text. So that Michael Scot may not only have known of the translation made by Girard of Cremona, but may have had it before him when working at his own translation from Averroes, and have purposely taken pains to make the cues correspond exactly to the text, while allowing himself more freedom in the interior of his paragraphs.

After all, the main importance of the above hypothesis, if it be well founded, is this: if there *was* a Latin form of the *De Coelo et Mundo* by Girard of Cremona in circulation before Michael Scot's translation of the Commentary, this version and the other (by Gundisalvi and John of Seville) gave Ristoro two chances, instead of one, of access to a Latin<Arabic text of Aristotle's work in a form uncombined with the Commentary of Averroes.

However that may be, the (Latin<Arabic, version of the first type) text of Aristotle in the edition of Venice 1489 reads as follows, on the subject referred to by Ristoro:

" De celo & mundo. Liber secundus 15 [Vol. I, fo. D 4, v°.]: " Dicamus etiam " quod non vocamus dextrum in omni habente dextrum nisi vbi est principium " sui localis motus. et cum ita sit & initium est motus celi ex parte a qua ascendunt " stelle necessario iste locus erit dextrum celi: & ubi cadunt erit sinistrum celi. " Si igitur celum incipit moueri ex dextro & reuoluitur ad dextrum: tunc orbis " superior: necessario latebit nos & non videbimus ipsum: & si locus superior " sit cadens sub visu necessario erit motus celi ad sinistrum quod non dicimus " esse omnino ".

Averroes' comment is [*ib.*, margin]:

" 15 § Dicamus. Uult declarare que pars est dextra in orbe & que sinistra: " &. d. dicamus etiam &c. i. manifestum est per se quod vocamus dextrum in " habente dextram partem ex qua incipit moueri in loco: & hoc manifestum " est in animalibus. D. d. & cum ita sit &c. i. & cum dextrum est pars ex qua

[1] Venice, 1489; for full title v. Bibliog.; it is understood to be the second edition of the ed. prin. of 1483, v. RENAN, *Averroès et l'Averrotsme*, 2 ed., Paris, 1861, p. 86.

" incipit moueri in loco. pars autem ex qua celum incipit moueri est pars ex " qua ascendunt stelle fixe: ergo illa pars est dextrum celi: oppositum autem " sinistrum celi: sed habet quendam questionem quoniam si intelligit dicere per " hunc locum quod est dextrum celi aliquem locum orbis in quo est principium " potentie istius motus propter quem motus est ex oriente in occidentem: & " sinistrum est pars orbis in qua est potentia opposita illi potentie necessario " illa pars mutabitur. aliquando igitur erit in occidente et aliquando in oriente " & aliquando super terram & aliquando sub terra quomodo igitur dicitur quod " oriens est locus dextri celi & occidens est locus sinistri celi. & visum est " mihi dicere in hoc quod dextrum celi attribuitur orienti quia est locus in quo " cum fuerit dextrum celi scilicet locus in quo est potentia principij motus erit " pars celi in qua est potentia ad ante super terram. cum vero dextrum celi fuerit " in occidente, tunc pars que est super terram est posterius celi: & hoc est " vnum de his que possumus intelligere quod oriens est dextrum celi: & in- " tendit hoc per orientem primum earum que ascendunt super primum orizonta " istius habitabilis ex occidente & per occidens vltimum occidens ex orientibus " habitabilis: & totum hoc erit cum posuerimus quod locus habitabilis terre " est habitatio naturalis et quod impossibile est transmutari ad alium locum: " & forte hoc putauit Albumasar secundum contingit huic vt in oriente sint " infinite virtutes: & materiales. i. si materiales ergo corporales: & si non " corrumpuntur tunc possibile redditur impossibile. & iam ostensum est quod " eternum non habet potentiam ad corruptionem quapropter credendum est " quod iste potentie non sunt materiales: & non dicuntur dextrum & sinistrum " nisi per similitudinem & mos assimilationis est quia apparet in orizontibus " terminatis: erit ergo locus ortus solus primi inhabitabilis locus in quo primo " apparet virtus motionis sicut si imaginaueris in isto loco extrinseco quamuis " illic neque sit extrinsecum neque intrinsecum: & hoc simile est illi quod dicit " Aris. in vltimo. viij. physi. quia mouens orbem est in maximo circulo qui est " in eo quia est velocissimus circulorum qui sunt in orbe. & similiter dicit hoc " quod mouens orbem est oriente: & sic non mutabitur dextrum. quamuis partes " orbis mutabuntur quemadmodum si mouens esset extrinsecum & est sine dubio " in medio orientis. in physicis enim determinauit circulum in quo est mouens. " s. circulum in quo apparet potentia eius hic vero determinauit locum circuli in " quo apparet potentia mouendi & in respectu istius loci dicitur locus oppositus " ei sinistrum & locus circa quem est iste motus qui incipit celi dicitur ante " celi & eius oppositum dicitur retro: & similiter dicitur alter duorum polorum " superius celi & alter inferius: & per hanc explanationem remouentur omnes " obiectiones contra Aris. D. d. si igitur celum incipit &c. i. in hoc propaluit " quod intendebat per dextrum orizonta orientale primum non propriam partem " orbis: & ideo dixit. Incipit in dextro & reuertitur in dex- " trum. i. incipit a loco ex quo apparet potentia mouendi: & appropriatur " mouens parti proprie donec reuertitur ad ipsum: & hoc impossibile est imagi- " nari sicut diximus nisi potentia que est in loco sit separabilis a corpore orbis. & " declaratur per / hoc quod locus oppositus est ei sinistrum: & quod polus latens " est superius & apparens inferius. & est dicere in hoc loco superius & inferius " & nobile & ignobile. non sequitur ex hac positione quod in orbe sit pars " nobilior alia vt sit compositus ex partibus diuersis. stelle enim sunt partes " nobiliores celi: & ideo manifestum quod non componitur ex contrarijs: & non " sequitur vt successio sit semper ex mistione contrarij sicut dicit Alex. in multis " locis ".

Besides the above mentioned translations of the *De Coelo et Mundo* there was, after 1260-1, a translation directly from the Greek. This

is attributed to William of Moerbeka, and was the version known to St. Thomas Aquinas [1]. In the Venice 1489 edition this text is also given, in unnumbered paragraphs which precede the others one by one. Our passage reads, in this version:

" Dextrum enim vnumquodque dicimus vnde principium eius qui " secundum locum motus. celi autem principium circulationis vnde " ortus astrorum quare hoc utique erit dextrum vbi autem occasus " sinistrum. si igitur incipit incipit [sic] a dextris & " a sinistris circumfertur: necesse quod sursum esse " immanifestum polum. si igitur erit manifestus a sinistra erit " motus quod non dicimus ".

The critical words here: " ... incipit a dextris & a sinistris cir- " cumfertur "... are strangely distorted; the accepted Greek text [2] reads:

" ... δεξιὸν γὰρ ἑκάστου λέγομεν, ὅθεν ἡ ἀρχὴ τῆς κατὰ τόπον κινήσεως· " τοῦ δ' οὐρανοῦ ἀρχὴν τῆς περιφορᾶς, ὅθεν αἱ ἀνατολαὶ τῶν ἄστρων, ὥστε " τοῦτ' ἂν εἴη δεξιόν, οὗ δ' αἱ δύσεις, ἀριστερόν. εἰ οὖν ἄρχεταί τε ἀπὸ " τῶν δεξιῶν καὶ ἐπὶ τὰ δεξιὰ περιφέρεται, ἀνάγκη τὸ ἄνω εἶναι " τὸν ἀφανῆ πόλον· εἰ γὰρ ἔσται ὁ φανερός, ἐπ' ἀριστερὰ ἔσται ἡ κίνησις, " ὅπερ οὔ φαμεν ,,.

Note how closely word for word the translation elsewhere follows the original.

The text of this version which is printed in connection with Thomas Aquinas' *In Libros Quatuor de Coelo et Mundo Aristotelis Expositio*, in the Antwerp 1612 edition of the *Opera Omnia*, though otherwise practically identical, has a different but no better reading here:

Lib. II, Lectio III, § h [Vol. II, 2d Commentary, fo. 35 (= E3) r°]:

" ..... Si igitur incipit a dextris, & ad sinistra circumfertur, ne- " cesse quod sursum esse immanifestum polum. Si enim erit, qui ma- " nifestus, ad sinistra erit motus: quod non dicimus ". Brought to this form, the first " ad sinistra " is flatly contradicted by the second [3].

Thomas Aquinas in his commentary (*ib.*) renders properly: " Si " ergo motus caeli incipit a dextris & circumfertur ad dextrum... ". He therefore either had a correct text, or got the correct sense from

[1] JOURDAIN, op. cit., pp. 40-1, 67-9, 167, 395, 397; & *Spec.* X on pp. 409-10.

[2] ARISTOTELES, rec. I. Bekker, ed. Acad. regia Borussica, Berolini, 1831, vol. I, p. 285, col. 2, ll. 16 sqq.

[3] The *Joannis Argyropoli translatio* (late XV cent.) which is given in parallel columns with the other, has the correct form: " Si igitur a dextris incipit & circum- " fertur ad dextra ". In the Rome 1882-1906 edition the last word here is *dextram* (Vol. III, p. 132).

the context — as indeed no one could fail to do — and Ristoro might have done the same [1].

There is therefore no evidence in the foregoing presentation to justify a conclusion as to whether Ristoro used a Latin < Arabic or the Latin < Greek translation. The question whether he used Thomas Aquinas for this citation must be left in abeyance. The possibility of his having used, not Aristotle alone, but Aristotle + Averroes, or Averroes alone, is also quite umanenable to discussion on the basis of the small amount of direct evidence which he furnishes us.

This difficulty is inherent in the problem generally; but for purposes of reference it may be well to consider also Albertus Magnus' presentation of the subject: —

Lib. II *de Coelo et Mundo*, Tractatus I, Caput V, *De dextro et sinistro, sursum et deorsum secundum traditionem veritatis* [Vol. IV (1890) [2], p. 135, col. 2]: " ... Dextrum ergo erit in coelo unde est " motus ejus... ". —

Cap. VI begins [*ib.*, p. 139, col. 2]: " Amplius autem de dextro " et sinistro loquentes, non nominamus dextrum alicujus rei, nisi " significando principium unde est motus localis ejus quod est ani- " matum. Si ergo hoc est secundum hoc et principium motus coeli " supremi, scimus esse in parte et loco unde oriuntur stellae fixae: " tunc procul dubio idem locus et pars est et dextrum coeli et locus " partis ubi occidunt stellae est sinistrum coeli: et hic est locus et " pars occidentis motus coeli superioris. Si ergo c o e l u m i n c i p i t " r e v o l v i i n m o t u s u o e x d e x t r o e j u s, e t i n c e d i t " e t r e v o l v i t u r s u p e r s i n i s t r u m a d i d e m d e x t r u m " i p s i u s: tunc procul dubio oportet quod superius orbis primi sit " polus Australis qui occultatur a nobis in hac quarta nostrae habi- " tationis... ". —

Cfr. also Tract. II, cap. IV, *De assignatione causae quare coelum movetur ab Oriente in Occidentem, et non e converso* [*ib.*, p. 158, col. 1]: " ... quoniam nobilius et melius est ut... principetur iste motus in " ipso a meliori loco ejus ut meliori parte: pars autem et locus no- " bilior est in dextro: o p o r t e t e r g o u t s i t a d e x t r o m o t u s " e j u s... ".

Aristotle is not mentioned specifically as the authority for any of the above passages; nor is the title *De Coelo et Mundo* ascribed definitely to him — according to the standard edition, mentioned above; but it was of course known that Albertus Magnus based his

[1] I have not given a great deal of context; there are several chapters which are quite explicit.

[2] *Opera omnia*, Paris, 1890-99.

work largely on Aristotle's, and deliberately followed the latter in arrangement of material.

I am not prepared, therefore, to say that Ristoro did not use Albertus Magnus for his citation of Aristotle. But I feel extremely skeptical about it, for this and other passages — as will appear from time to time: the positive evidence of connection with Albertus Magnus is always lacking, even in instances where it might naturally be expected to appear.

II. Averroes (1120?-1198).

Averroes is mentioned once in Ricc. 2164 [1] as follows:

Lib. II, Dist. VIII, cap. 12, beginning [54 r°, col. 1]: " Capitolo " duodecimo dareprouare lopinione de coloro keuolsaro dire kelaterra " fosse descoperta delaqua e abetata ella parte del meço die secondo " quella [*sic*; scribal cancellation] kella e ella parte de setentrione. " Fuoro tali Saui ke diceano e opiniauano kellaterra era " scoperta dalaqua e abetata ella parte delmeço " die. especialemente lauerrois. loquale fo gran- " dissimo elomagiure desponetore darestotele. " Edicea keper quella rascione ke laterra era " abetata ellaparte [2] del meço die. E questo dicea " perke losole andaua sopra quella parte keli " sarea andato quasi ocioso. § Secondo lo detto elopinione dequello

[1] The Chigian Ms. has the chapter I, 22, in greatly expanded form, and in the additional matter Averroes is cited, in the following terms: " ..... lo termine di " crescere in bilta et in uigore sie. 35. anni. et adonque conuiene conuiene [sic] che " altretanto tempo si metta a inuecchiare et andare a neente et cioe prouato per " auerois..... " [25 v°, col. 2, end - acc. to Narducci, op. cit., p. 193, ubi v. for the full text].

The chapter in Ricc. 2164 is very short, and contains no mention of Averroes; the following is the complete text [9 r°, col. 2]: " Capitolo vinti & doi delauita " determenata deli animali. Trouamo ogne cosa ke engenerata deli elementi auere " tempo & uita determinata & spetialemente lianimali come lomo ke detto per " li saui ke uiue Setanta anni. & locauallo uiue trenta anni. & lotauro uiue en bonta " cinque anni et cosi detutti". The straightforward and simple unity of this passage would hardly seem to be the result of a condensation, or rather a clever selection of phrases, from the longer form, if the latter were conceived of as representing the original; and much less can it be due to scribal carelessness in copying from such an original: there are no misleading homologies to favor such a possibility; and the omissions are too various in their collocations.

[2] At this point there appears to be a hiatus; and here it would seem that the Chigian Ms. retains the correct form of the sentence in the original: " ..... e dicieua " che per quella ragione chella terra era abitata nella parte di settemtrione e " per quella medesima ragione era abitata nella parte del mezo dj....." (100 r°, col. 2, beginning — acc. to Narducci, op. cit., p. 293). The scribal error made in Ricc. 2164 in this case is very easily understood: the repetition of " era " abitata nella parte " would easily mislead the eye.

" Sauio potremmo dire una grandissima inconuenientia ke per quella " rascione ke laparte de settentrione epiena esofolta degrandissima " moltitudine destelle, per quella medesma rascione dea essare la " parte del meço die piena esofolta similemente de grandissima mul- " titudine destelle. Cum ciosia cosa ke noi latrouiamo aquello re- " specto rada einuda destelle. § non consideraro sutilemente ne " bene ladispositione del cielo nelecasioni co elli despone laterra. Et " cuncio sia cosa kel cielo despona la terra efaciala abetare uediamo " sequella parte po essare abetata. Et noi trouamo secondo ke ponon " li Saui especialmente lalfagrano elloctauo capitolo kelmare con- " prende lo primo clima loquale confina collo encomençamento dela " parte del meço die da oriente adoccidente... ".

Since Ristoro mentions Averroes specifically as expounder of Aristotle [1] we naturally turn to his Commentary for our source. It is in his long discussion of the habitable portions of the earth's surface, anent Aristotle's chapter on the Winds, in the Second Book of the *Meteora* (more precisely: in treating of a section found in Chapter V in the standard editions of the Greek text, the translation of which forms part of the long. " Capi. 2. De ventis " in the Venice 1489 edition). The Latin text [2] of Averroes, after discussing the habitability of the various zones of our hemisphere, and of the tropics, adds:

" Sed nos cum posuerimus rem esse ita vt declaratum est de " dispositione solis: s e q u i t u r v t s i n t l o c a i n q u i b u s " p o s s i b i l i s s i t h a b i t a t i o s e c u n d u m i s t u m m o d u m " i n d u a b u s p a r t i b u s c i r c u i t u s s o l i s . s . s e p t e n- " t r i o n a l i s & m e r i d i o n a l i s Et hoc iam dictum est ab " aris. Nam ipse affirmat vt sit alia habitatio in quarta meridionali " similis quarte habitabilis septentrionalis. Et si ecentricum solis " habet diuersitatem sensatam erit latitudo partis habitabilis ex parte " meridionali propinquior polo meridionali: & remotior a circuitu " solis opposito modo quam res se habet in parte septentrionali " [fo. y 3 r°, col. 2].

As in the case of Aristotle, it is interesting to note that Ristoro

[1] With Ristoro's estimate of Averroes in that capacity cfr. Dante's: " Averrois, " che il gran comento feo " [*Inf.*, IV, 144]. Roger Bacon, on the other hand, gives this honor to Avicenna: " Avicenna quidem praecipuus imitator et expositor Ari- " stotelis..... " [*Opus majus*, Pars secunda, Cap. XIII; vol. I, p. 55]; and again: " ..... et quoniam ubique Avicenna fuit perfectus imitator et expositor Aristotelis " atque dux et princeps philosophiae post eum..... " [*ib.*, Pars quinta, Distinctio prima, Cap. V; vol. II, p. 10]. Yet Bacon often mentions Averroes.

[2] That of Books I-III of Aristotle's *Meteora* is ascribed to Girard of Cremona; v. STEINSCHNEIDER in *Wien Akad., Sitzungsber.* (phil.-hist. Kl.) vol. 149, 1904, IV Abhandl., p. 17, — but to whom to ascribe the Latin translation of Averroes' commentary on those three books is not clear. Michael Scot is thought to have done this for Book IV only; v. STEINSCHNEIDER, *ib.*, p. 56, c.

cites Averroes only to contradict him [1]; and to his aid he calls, as the last sentence above quoted from him shows, his favorite authority Alfragan. And this leads me to my next, and perhaps most significant, chapter.

III. Alfragan (early IX century).

There were extant in Ristoro's time two Latin versions of Alfragan's famous Arabic work on Astronomy [2]: one, the somewhat abbreviated translation made by John of Seville in 1134-5, is the "Vulgate" text on which were based the editions of Ferrara 1493, Nuremberg 1537 and Paris 1546; the title is given variously [3]. The

[1] Albertus Magnus, *Lib. de Natura Locorum*, tract. I, cap. VII [vol. 9 (1890) pp. 542-3]: "Utrum habitabilis sit quarta terrae quae est ab aequinoctiali usque in polum Australem?", says, inter al.: "Sed his contrarii "sunt plures Philosophorum. Averroes enim in commento super librum quartum "Coeli et Mundi, dicit et Aristotelis et suam fuisse opinionem, quod loca "illa sunt habitabilia, et rationem adducit id necessario probantem, ut mihi "videtur: dicit enim inter calidissimum et frigidissimum esse temperamentum: "necessario etiam est locus / calidissimus sub tropico hyemali: frigidissimum autem "esse necesse est sub polo, eo quod obliquissime locum illum radii solis respi-"ciunt: igitur in medio per aequidistantiam ab utroque locus erit "temperatus et congruus habitationi. Negat enim Averroes solem eccen-"tricum circulum in quo moveatur, habere: et ideo tertiam causam caloris sub "tropico hyemali dicit esse falsam et nullam: sed potius dicit quartam quae est "ab aequinoctiali circulo usque in polum Australem, esse divisibilem per climata "habitabilia, sicut et quarta terrae dividitur Septentrionalis, in qua nos habi-"tamus" (The "librum quartum" is evidently an error, but one hardly imputable to Albertus Magnus himself). There is nothing to prove that this was not Ristoro's source, nor on the other hand to prove that it was.

Thomas Aquinas does not mention Averroes when treating of this subject: — In his comment on *Meteorologicorum*, Liber II, Cap. V [Lectio X; in Vol. III of *Op. omn.*, Rome, 1886, p. 419] we find: § 2: "Dicit ergo primo quod duae partes "sunt quae possunt habitari: una quidem quae est versus superiorem polum arcti-"cum, in qua scilicet nos habitamus; altera vero est versus alterum polum, et est "nobis ad meridiem, sicut et nostra habitabilis est eis ad meridiem ipsorum. Sed "utrum illa terra habitetur, relinquit immanifestum"... — And cfr. his comment on *De caelo et Mundo*, Lib. II, Cap. II [Lectio III; in Vol. III, p. 133 — commenting on "Et ibi quidem habitantes....."], § 16: "Hemisphaerium autem hic videtur "accipere secundum quod dividitur caelum per circulum aequinoctialem aeque "distantem ab utroque polo. Et ex hoc patet Aristotelem hic dicere quod etiam "ex alia parte aequinoctialis aliqui homines habitant vel habitare possunt, in "parte opposita nobis".

Ristoro, it will be seen, is contradicting both Albertus Magnus and Thomas Aquinas (who gives silent assent), as well as Averroes and Aristotle. I cannot believe that he knew any of these encyclopaedic writers directly.

[2] There was also a Latin translation by Hugo Sanctelliensis (XII cent.) of a commentary on Alfragan's work; v. C. H. Haskins, *The Translations of Hugo Sanct.*, in the *Romanic Review*, vol. II, nº 1, Jan-Mar. 1911, pp. 7-9; also Steinschneider, op. cit., in *Wien Akad., Sitzungsber.* (phil.-hist. Kl.), vol. 149 (1904), IV Abhandl., pp. 35-6.

[3] V. Steinschneider, loc. cit., p. 44, h. (the date of the Ferrara ed. (princeps) is misprinted 1497). — For date of translation v. also Campani, *Alfragano*, 1910, pp. 22-3; for description of edd. of 1537 and of 1546, v. ib., pp. 19-20.

second and more faithful translation, due to Girard of Cremona, occurs in numerous Mss. regularly entitled: *Liber de Aggregationibus Scientiae Stellarum*, &c. [1] Of this version I have had access to one manuscript in the Laurentian Library, Florence (Plut. XXIX, Cod. IX, catalogued as of the XIV century), and to one in the Bodleian (Cod. Digbeianus 215 — of the XV century) [2].

A Hebrew translation based upon some Ms. of this second version, with corrections from the Arabic original, was made by Jacobus Antoli 1231-5; and from this Hebrew it was again turned into Latin and published (Frankfort 1590) by J. Christmann, who was acquainted both with printed texts of the Vulgate version and with one Ms. (rather widely variant, in some parts; v. CAMPANI, op. cit., 36, 51) belonging to the second version [3].

Ristoro cites Alfragan by name seven times (out of the twenty accredited citations of authors found in Ricc. 2164); one of the passages in question is a translation of a long chapter, four other citations are by chapter number (one repeated elsewhere). Besides this, it is from Alfragan's work that Ristoro gets his authority for two other attributions (one repeated elsewhere) to definite names; and as the passage in which these two separate authorities are both named shows clearly and simply which of the two Latin versions of Alfragan was used by Ristoro, I shall present it at once, as a sub-chapter. —

[1] V. CAMPANI, op. cit., pp. 27-8; STEINSCHNEIDER, loc. cit., p. 22, § 53; cfr. *Bibl. Gén. de l'Astron.*, vol. I, 1887, p. 465, n° 1112, end — which however does not recognize the difference bet. the two versions, and gives manuscripts of the second with the Vulgate editions.

[2] The Laur. Ms. is the one printed, unfortunately with corrections (v. pp. 12-13), by Campani. He judges it to be early XIII c.

[3] Of this latter " versio " he says p. 5: " Longe melior & perfectior, incerti " tamen authoris, extat in bibliotheca Palatina..... quae translationi Hebraeae " magna ex parte respondet ". Yet he persisted in thinking the Hebrew translation based on the Vulgate version: e. g. he says, p. 6: " Quod ad Hebraeum interpretem " attinet, non immerito inter philosophos celebrandus est, quod operam suam con- " tulerit ad illustrandam astronomiam, & ad repurgandam Latinam Alfragani ver- " sionem, quam Iohanni Hispalensi acceptam referunt... nam ex codice Arabico " Alfragani, se versionem vulgatam correxisse testatur cap. 10 hisce verbis: *in* " *libro Arabico autor plura dicit de his locis ratione vmbrae, sicut de aliis climatibus:* " *sed in libro Romanorum* (ita vulgatam Latinam Ioannis Hispalensis versionem " vocat) *non sunt translata*: *ideo non adscribemus* ". — Cfr. CAMPANI, op. cit., p. 38.

A large amount of misinformation about the various versions of Alfragan may be found on p. 63 of DELAMBRE, *Astron. du moyen âge*, Paris, 1819.

The printed editions are described by TOYNBEE, *Dante's Obligations to Alfraganus*, *Romania*, XXIV, 1895, pp. 413-417; he is not accurate in saying, p. 414, that the version of Christmann was " based upon that of " John of Seville; Christmann says distinctly, in his Dedication, p. IJ " ..... paraphrasin Hebraeam Iacobi " Antolii..... Latine reddidi ". It is also difficult to see why Toynbee so often quotes Dante's sources from the Latin text of the edition (of the Arabic, and translation) of Golius, Amsterdam, 1669, when he had all the versions at hand.

IV. PTOLEMY (late II cent. A. D.); ABU MANSUR (early IX c.).

Ricc. 2164 reads:

Lib. I, cap. 3, end [2 r°, col. 1]: " ..... questi doi ponti so detti " Sol stitio enpercio ke quando lo sole e en sū [sic] questi doi ponti " sta & non ua piu enuerso sententrione ne enuerso lomeço die. anti " torna enderetro. E questi doi ponti opositi segono sopra uno " cerkio del quale noi auemo facto mentione loquale sega in ambedoi " lipoli unaltro cerkio ke passa per lo ponto dariete & delibra liquali " diuidono lo cielo en quarto. § questo cerkio ke decto " çodiaco e declinato dal cerkio delequatore da " ogne parte uinti & tre gradi & cinquanta & " uno menuto secondo lasententia deptolomeo. " & secondo laconsideratione prouata da Jouanni " filiolo delalmasore cum multitudine daltri sauij " elli die del Re Maimone e trouata Vinti & tre " gradi & trenta & cinque menuti. § questo cerkio " secondo ke detto e ampio dodeci gradi & lalinea encliptica cioe " lauia del sole passa per lomeço luna parte pone dal meço die & " laltra pone dasettentrione ".

Ptolemy is later cited again on this same point: Lib. II, Dist. v, cap. 6, middle [Ricc. 2164, fo. 31 r°, col. 2]: " ..... Et per lo meço " de questa uia per longo da oriente adoccidete passa locerckio de- " lequatore daloquale e declinato locerkio del " cancro vinti e tre gradi e cinquanta e uno menuto. " secondo la sententia del grande tolomeo. loquale " cerkio e da luno lato dequesta uia definendo enuerso settentrione " enmodo duno fossato. Et lo cerkio del capricorno ke dalaltro lato " enuerso lo meço die difinendola enmodo duno fusato. e declinato " altretanto. secondo la sententia sua. adonque questa uia sara " perlato dal settentrione almeço die quaranta esette gradi. equa- " ranta edui menuti..... ".

With the first of these two quotations compare the Vulgate text of the editio princeps:

[Ferrara 1493. — 2d unnumbered leaf after " aiiij ", r°, beginning]: " Differentia quinta de duobus primis motibus celi quorum " vnus est motus totius, alter vero stellarum quem videntur habere " in orbe signorum... Si enim duo magni circuli secent se & vnus " circulus magnus transeat per polos alterius tales duo circuli se- " cabunt sese in punctis diametraliter oppositis Cum autem hic cir- " culus magnus transeat per vtriusque polos eorum secabit vtrunque " in punctis maximarum declinationum. & necesse est vt abscindat " circulum signorum super vtrosque punctos qui sunt in vltima decli-

" natione & longitudine ab equinoctio diei versus septentrionem &
" meridiem: nominaturque punctus septentrionalis punctus sol-
" sticij estiualis. quia sol cum est in illo puncto describit solsticium
" estiuale quod est inicium signi cancri. Meridianus vero nominatur
" punctus solsticij hyemalis qui est inicium capricorni. & arcus idest
" pars circuli qui est inter lineam equinoctialem & punctum Solsti-
" cialem huius circuli descripti super vtrosque axes qui est inter
" vtrosque punctos solsticiorum & equinoctium diei est quantitas
" declinationis circuli signorum ab equinoctio diei. Et est secun-
" dum quod inuenit Ptholomeus vigintiquatuor
" graduum. Probatione autem certissima qua pro-
" bauit Almeon qui interpretatur securus vel
" pacificus siue fidelis: & conuenerunt in ea plures
" sapientum quod est vigintitrium graduum &
" trigintatrium minutorum... ". (The Nuremberg 1537 ed. is practically identical with this; the ed. of Paris 1546 varies essentially only in the following: p. 16: " Et est secundum quod " inuenit Ptolemęus 23 graduum, & 51 minutorum ,, which happens to coincide with Ristoro's figures. The Paris ed. seems, in general, to be more accurate than the other two; and in this case the 24° flat of the other editions was doubtless corrected to 23° 51') [1].

Now read the passage as it occurs in the version by Girard of Cremona (Cap. 5):

Bodl. Ms. (48 r°, col. 2):

" ..... Et in orbe quidem figuratur
" circulus tertius in latitudinem pro-
" cedens aseptentrione usque ad me-
" ridiem transiens per polorum [sic]
" horum duorum circulorum qui no-
" minatur circulus lineatus super polos
" duorum orbium et secat unum-
" quemque duorum orbem equatoris
" diei et orbem signorum in media.
" Necessarium igitur est ut ipse secet
" orbem signorum super duo puncta
" que sunt in ultima declinatione. et
" elongatione ab equatore diei in
" utrisque partibus septentrionis et me-
" ridiei § Et nominatur punctum se-
" ptentrionale punctum tropici esti-
" ualis quod est principium signi
" cancri. et meridionale punctum tro-
" pici estiualis quod est primum signi
" capricorni § Et arcus huius circuli
" lineati super polos qui est inter

Laur. Ms. (IIII r°-v°):

" ..... Et in orbe quidem figuratur
" circulus tertius in latitudine pro-
" cedens a septentrione ad meridiem.
" transiens per duos polos horum duo-
" rum circulorum qui nominatur cir-
" culus lineatus super polos duorum
" orbium & secat unumquemque duo-
" rum. s. orbem equatoris diei. & orbem
" signorum in duo media.
" necessarium igitur est. ut ipse /
" secet orbem signorum super duo
" puncta que sunt in ultima declina-
" tione & elongatione ab equatore
" diei in utrisque partibus septen-
" trionis & meridiei. & nominatur
" septentrionale punctum tropici esti-
" ualis. quod est principium signi
" cancri. et meridionale punctum tro-
" pici hyemalis & est principium signi
" capricornii. Et arcus huius circuli
" lineati super polos qui est inter unum-

[1] V. CAMPANI, op. cit., p. 74, n. 2.

" unumquodque duorum punctorum " tropitorem [sic] et inter equatorem " diei est quantitas qua declinat orbis " signorum ab equatore diei et est se- " cundum quod ptholomeus reperijt " .23. gradus et XXXXI minutum. " cum sit circulus trecente et sexa- " ginta partes secundum considera- " tionem uero temptatam quam § Jo- " hannes filius almansoris conside- " rauit in diebus maimonis regis et " conuenit in ea numerus sapientum " est 23. gradus et XXXV minuta... ".

" quodque duorum punctorum tropi- " corum & inter equatorem diei est " quantitas qua declinat orbis si- " gnorum ab equatore diei et est se- " cundum quod ptolomeus reperiit " 23 gradus & 41 minutum cum sit " circulus 360 partes. Secundum con- " sideratione uero consideratam uel " expertam quam Johannes filius Al- " masoris consideravit in diebus mai- " monis et convenit in ea numerus sa- " pientum est 23 gradus et 35 mi- " nuta..... ".

Christmann's edition, which, it will be remembered, belongs indirectly to this version, gives 23° 51' as does Ristoro (in Ricc. 2164, Ricc. 2229, Chig.), and the Paris 1546 edition of the Vulgate (*v. supra*). The Bodl. Ms. and the Laur. Ms. must therefore both derive ultimately from a common ancestor which varied from the original in having as one of its distinctive features 41' instead of 51' — the latter being the correct figure for the Ptolemaic finding [1].

Two main conclusions result from these comparisons: first, that Ptolemy and Abu Mansur are not quoted directly, but through Alfragan; and second, that Ristoro was using a Ms. of Alfragan belonging to the version by Girard of Cremona. This second conclusion will be strengthened beyond any doubt by some of the evidence to be presented in the next chapter.

The only other reference, in the *Composizione del Mondo*, to Ptolemy is the following:

Lib. I. cap. 17, beginning [Ricc. 2164, fo. 6, r°, col. 2]: " Capitolo " settimo decimo delesententie & delopinioni lequali so del mouimento " de loctaua spera. et de le stelle le quali so in essa. T u t t e q u e s t e " s t e l l e ke noi auemo decto desopra lequali segono elloctaua spera. " s e c o n d o l a c o n s i d e r a t i o n e d e t o l o m e o & d e t u t t i " l i a l t r i S a u i. s e m o u o n o c u m t u t t a l a l o r o s p e r a. " & c u m l e s p e r e d e l e S e t t e s t e l l e l e q u a l i s o k i a- " m a t i p l a n e t i. i n o g n e c e n t o a n n i u n o g r a d o & " empercio se mutano lauge deli planeti & liloro geuçaar. cioe liloro " capeta dedragone & leloro caude dedragone secondo quella uia. & " questo mouemento ekiamato mouemento doctaua spera. § Tali " Saui fuoro come fo afagrano ke stando locielo trecento Sesanta " gradi pose lareuolutione delestelle fixe & li auge de le Sette Stelle " lequali so kiamate planeti. & liloro geuçaar. seghino lorbe deli " segni entrenta & sei miliaia danni ".

[1] V. CAMPANI, ed. cit., p. 74, where the editor has changed the reading 41 of the Ms., and cfr. n. 2, there — to which I have referred above.

But the references in this to both Ptolemy and Alfragan are evidently explained by the following passage from Girard of Cremona's version of Alfragan:

Bodl. Ms. (51 r°, col. 2 s.):

" Capitulum 13 de narratione motuum stellarum.

" Et postquam premisimus narra-
" tionem figure spatium [sic] stellarum
" et compoitionis [sic] orbium ipsarum
" Incipiamus referre motus qui sunt
" in unaquaque spera earum et inci-
" piamus a relatione motus spere stella-
" rum fixarum quoniam est motus unus
" inseparabilis ab omnibus stellis cur-
" rentibus § Dicamus ergo quod ipsa
" mouetur ab occidente ad orientem
" et mouet secum speras stellarum sep-
" tem similiter super duos polos orbis
" signorum. in omnibus / centum annis
" parte una secundum considerationem
" ptholomei Et per illud permutantur
" auges stellarum. VII. et gençahar
" earum secundum continuitatem si-
" gnorum in omnibus centum annis hac
" quantitate Et fit reuolutio earum in
" orbe signorum toto in triginta sex
" milibus annis ".

Laur. Ms. (10 v°):

" Capitulum 13.

" Et postquam premisimus narra
" tionem forme sperarum stellarum &
" compositionis orbium ipsarum Jnci-
" piamus referre motus qui sunt in
" unaquaque spera earum. et inci-
" piamus a relatione motus spere stel-
" larum fixarum. quoniam est motus
" unus inseparabilis ab omnibus stellis
" currentibus § Dicamus ergo quod
" ipse mouetur ab occidente ad orien-
" tem. et mouet uel mouentur cum eo.
" secum speras stellarum 7. similiter su-
" per duos polos orbis signorum in omni-
" bus 100 annis parte una. secundum
" considerationem ptolomei et propter.
" illum permutantur auges stellarum
" 7. et gençaphar [*or* geu-] earum. se-
" cundum continuitatem signorum uel
" successionem in omnibus 100 annis
" hac quantitate & fit revolutio earum
" in orbe signorum toto in. 36000. an-
" nis. uel ipse secant çodiacum et
" reuoluitur in eo toto ".

Ptolemy, therefore, as direct source of citations by name has been eliminated.

V. Alfragan (continuation).

The chapter which is translated by Ristoro nearly in its complete form, from the Latin version of Alfragan which he used, is a summary of the geography of the entire known world; and in its host of proper names it presents material for placing its exact source which would be unequalled if one were in a position to control all the manuscripts of that version of Alfragan. In particular, the great majority of the names of cities would certainly be unfamiliar fo the average scribe; so that each manuscript would vary unmistakably from all the others.

In the two Mss. of the version by Girard of Cremona which I present, this feature is evident. I give in parallel columns the readings, respectively, of Ristoro's text in Ricc. 2164, and the Ms. Chig. (acc. to Narducci, op. cit., pp. 249-250), and of Girard of Cremona's Latin version as preserved in the Bodl. Ms. and the Laur. Ms.:

Ricc. 2164:

Lib. II, Dist. v [fo. 34 v°, col. 1-35 r°, col. 1].

" Capitolo singulare..... Poike noi
" auemo tractato de sopra deli sette
" climata. poniamo li nomi delege-
" nerationi e delecita lequali so en-
" nessi. denomenate e defenite se-
" condo la sentença deli Saui. ema-
" giuremente delalfragano. et enco-
" mençamo dalaparte doriente elle
" regioni de Sen. e passa per lere-
" gioni de Sin alaparte del meço die.
" Et ennesso e la cita del Re de
" Sin & affir laquale e la nobilita de
" Sin. poi passa per liliti delmare ello
" meço die de leregioni dindia. poi
" passa per lomeço die de leregioni da
" asind. poi. passa ello mare perlisola
" de altubil. e sega lomare per fine
" alisola deliarabi. e laterra deliarabi
" alimen. e sono ennesso delecita
" conosciute. la Cita Taphar. e
" dumne. & abromhor. & huden.
" & Sennaha. & alchain. & madre.
" & Cabela. & jurs. & madea. & Sabe.
" poi passa loclima alaterra docci-
" dente per lomeço die deleregioni
" delibarbari per fine atanto kelli
" uene almare doccidente. poi sega
" lo clima enuerso lomare rosso. e
" passa elle regioni de fiopia. e sega-
" lonilo degipto. et e ennesso lacita
" deloregno deli fiopi & e kiamato
" hurma. & ducala Cita denubia.

Chig.:

Lib. VI [sic] [64 r°, col. 2-65 r°, col. 2].

" Capitolo. singhulare..... Poi. che
" noi. auemo trattato di sopra delli.
" sette climati Poniamo li huomini
" delle regioni e delle cipta li quali.
" sono Jn essi. e denominate e defi-
" nite sechondo la sentenzia delli
" saui e magiormente del fagrano e
" incominciamo dalla parte doriente
" nello primo clima.....
" § Et lo primo clima si cho-
" mincia da oriente nelle regioni de
" syn e passa per le regioni de sin
" alla parte del mezo di et ennesso
" ella cipta del re de syn et Affir la
" quale ella nobilta de Syn. poi.
" passa per li liti del mare del mezo
" di delle regioni. dindia Poi. passa
" per lo mezo. di delle regioni da
" asind E poi. passa nel mare per
" lisola de altabil E sega lo mare per
" infino allisola delli arabi ella terra
" delli arabi alimen e sono innesso
" delle cipta Conosciute la cipta
" taphar. ed umen. et abroinhor. et
" huden. et Sennaha. et alchain. et
" madre. et cabela et Jurs. et madea.
" et Sabe Poi. passa lo clima alla
" terra doccidente per lo mezo di
" delle regioni delli. barbari per in-
" fino attanto chelli. viene al mare
" doccidente poi. sega. lo clima
" Jnuerso. lo mare Rosso e passa. le
" regioni del fiume loquale e chia-
" mato Nilo detiopia E sega lo nilo
" degipto / Et e innesso la cipta dello
" regnio dili Tiopi et e chiamata hir-
" rina. et ducala citta de nubia

" § lo secondo clima sencomença
" da oriente e passa per leregioni de
" Sin. e per leregioni dindia. poi per
" leregioni da asind. e ennesso e la-
" cita almansoria. & Aliabran &
" adubil. e poi passa arempetto del-
" mare uerde e delmare abasecil [?]
" e sega lisola deliarabi ella terra
" de nagidin e laterra de Turma.
" Et ine so in esso delacita [sic] Ali-
" hememali. & albaroen. & heger. e
" la cita Jechehib / & aliar. & Mecha.
" & atrahif. & Gada. poi sega en-

" § Lo sechondo clima si cho-
" mincia da oriente e passa per le
" regioni de syn e per le regioni
" dindia Poi. per le regioni da asind.
" e en esso e la cipta almansoria et
" aliabran. et adubil Et poi. passa
" a rinpetto del mare uerde e del
" mare abasteil. e sega. lisola deli
" arabi Ella terra de nagidin ella
" terra di turina. Et qui. sono in-
" nesso delle cipta alihemeinali. et
" albaiden. et heger. Ella cipta Je-
" chebib. et liar. et mecha. et atcaif.

Bodl.:
Alfraganus, Cap. 9 [49 v°, col. 2-50 r° col. 2].

" Et hic quidem rememoremur
" nominum regionum et ciuitatum
" notarum in omni climate / Et in-
" cipiamus in eis a parte orientis &
" declaremus prius intentionem logi-
" tudinum regionum & latitudinum
" earum Dicamus ergo quod longi-
" tudo cuiusque ciuitatis est elon-
" gatio eius ab initio quarte habi-
" tabilis ab oriente et occidente. et
" est quantitas rotunditatis equa-
" toris diei qui est inter circulum
" meridiei ciuitatis et circulum me-
" ridiei quarte habitabilis Latitudo
" autem est elongatio ciuitatis a cir-
" culo equalitatis que est secundum
" quantitatem eleuationis poli ab
" oriçonte § Primum quidem clima
" incipit in oriente a finibus re-
" gionum sui et transit per regiones
" sui a parte meridiei Et in ipso est
" ciuitas regis siri et asfanti que est
" sublimitas siri deinde transit per
" littora maris in meridie regionum
" indie Deinde per meridiem re-
" gionum asuid postea transit in
" mare per insulam altubil et secat
" mare usque ad insulam arabum et
" terram arabum alimen Et sunt in
" eo de ciuitatibus notis ciuitas
" taphar & humen et hadramot et
" aden et senaha et ahlan et madre
" et. cubellam et uirs. et madra et
" sabet Deinde secat clima uersus
" mare rubrum et transit in regiones
" ethiopum et secat nilum egipti et
" illic est in eo ciuitas regni ethiopum
" et nominatur hurnia et duicala
" ciuitas nubie Deinde transit clima
" ad terram occidentis per meridiem
" regionum barbarorum usque ad
" mare occidentis peruenit

" § Et secundum clima incipit ab
" oriente et transit per regiones sui
" et per regiones indie deinde per
" regiones asind et in ipsa est ciuitas
" almansora et aliabron et adubil
" Deinde transit per obuiationem
" maris uiridis. & maris albasara
" et secat insulam arabum in terra
" nagidin et terra tueina et illic sunt
" in eo de ciuitatibus aliememah et
" albarahem et eger & ciuitas ihetub
" et aliam & mecha et ataif et geda.
" deinde secat uersus mare rubrum

Laur.:
Alfraganus, Cap. 9 [fo. 8 r°-v°].

" Et hic quidem rememoremus
" nominum regionum et ciuitatum
" notarum in omni climate. & inci-
" piamus in eis a parte orientis &
" declaremus prius intentionem lon-
" gitudinum regionum et latitudi-
" num earum. Dicamus ergo quod
" longitudo cuiusque ciuitatis est
" elongatio eius ab initio quarte habi-
" tabilis ab oriente & occidente. et
" est quantitas rotunditatis diei
" equatoris. que est inter circulum
" meridiei ciuitatis & circulum me-
" ridiei quarte habitabilis. Latitudo
" autem est elongatio ciuitatis a
" circulo equalitatis que est se-
" cundum quantitatem eleuationis
" poli. ab oriçonte. § primum qui-
" dem clima incipit in oriente a fi-
" nibus regionum siri & transit per
" fines siri a parte meridiei & in ipso
" est ciuitas regis siri et assirium
" que est sublimitas siri. deinde
" transit per litora maris in meridie
" regionum indie. deinde per me-
" ridiem regionis asind. postea tran-
" sit in mare per insulam uel cafal.
" alcubil. & secat mare usque ad in-
" sulam arabum et terram arabum
" almen. & sunt in eo de ciuitatibus
" noctis [sic] ciuitas tophar & humen
" & aromorh. & dem. & scuha. &
" altahin & madre. & cubella. & nus.
" & madta. et sabe. Deinde secat
" clima ad terram occidentis per
" meridiem regionum Barbarorum
" usque quo peruenit ad mare occi-
" dentis. Deinde secat clima uersus
" mare rubrum & transit in regiones
" ethiopum. & secat nilum egypti.
" & illic est in eo ciuitas regni
" ethiopum & nominatur hurma. &
" diucalas ciuitas nubie .

" § Et secundum clima incipit ab
" oriente et transit per regiones sin.
" & per regiones indie. deinde per
" regiones assind. & in ipso est al-
" mansoria. et alibran & dubil.
" deinde transit per obuiationem
" maris uiridis. & maris abbassara.
" et secat insulam arabum in terra
" nagidin. & terra tuemam & illic
" sunt in eo de ciuitatibus aliememac.
" i. duo maria & alia rahen et heger.
" & ciuitas iethrib. & aliar & mecha.
" et raif & geda. deinde secat uersus

" uerso lomare rosso. e passa per
" said degipto. e sega lo nilo. & ine
" e in esso delecita la cita Cabrus.
" & hacrain. & ansche. & astar. &
" acsabe. & asin. & affrem. poi passa
" ella terra doccidente per lo meço
" deleregioni dafrica. poi passa per
" leregioni delibarbari e uene dal-
" mare doccidente.

" § loclima terço secomença da
" oriente e passa per settentrione
" elli regioni de Sin. & passa per le
" regioni dindia. & e ennesso lacita
" de halchinder. e poi per setten-
" trione elle regioni Asind. poi per
" leregioni de kebil. & charmen &
" Seiasten. & alexandria. & Ahl-
" mamhedia. & horcab. & assemian
" poi passa per liliti del mare albas-
" sara. & ene ennesso ine delecita.
" la cita astachar. & Johor. & fese.
" & Sabor. & Sciren. et Sitef & cha-
" bene. & Senenir. & maruben. Et
" passa per dioceses. Albagueç. &
" Alibibrac. et ennesso ene albassa.
" & Gnasit. & begden. & alcufa. &
" alhenber. & Seit. poi passa per le-
" regioni de ascemi & ene ennesso
" delecita. alhar. & sulumia. & dinis.
" & damascus. & aseir. & accon. &
" Tabaria & cessarea. & la casa de
" santificatione & aramlati & asca-
" lona. & gaça & madian. & alcuçun.
" poi sega leparti de sotto delaterra
" degipto. & ennesso ene alpharne.
" & Tapnis. & damiat. & fisatat
" degipto. & alfaium. & alexandria.
" poi passa per le regioni de Barha
" poi per leregioni de africa. et en-
" nesso e lacita alchiruen. e uene al-
" mare doccidente.

" § Lo quarto clima secomença
" dala parte doriente. e passa per le
" regioni Arebeit. e poi per cho-
" rascen. e sono ennesso delecita
" Mascoda. & Almisimati. & far-
" gana. & samarchat. & Bela. & Bo-
" chara. & haraha. & amria. & ma-
" ruçudur. & asheron. & Shareis. &
" Thodus. & niscibar. & Jurgon
" [or "-en"] & Corais. & Tha-
" bansten. & dambedurum. & Cor-
" duben. & heilen. & arei. & Jspahen.
" & keni. & heridem. & neudem. &
" hahemur. & hubaudi. & Scharoç &
" saramoçe. & almosil. & Talboch.
" & Nasabim. & Enit. & Capud

" e gada E poi. sega. inverso. lo
" mare rosso. E passa per said de
" egipto Et sega. lo nilo. e quiui. e
" Jn esso della cipta la cipta Cabrus.
" et hacrain et ansche. et astar. et
" acsabe. et asyn. et affren Poi.
" passa nella terra doccidente per lo
" mezo delle regioni. dafricha. Poi.
" passa per le regioni delli. barbarj
" E viene al mare doccidente.

" § Lo clima tertio si chomincia
" da oriente Et passa per setten-
" trione nelle regioni de sin Et passa
" per le regioni dindia. et. e innesso
" la cipta de halchinder. e poi. per
" settentrione nelle regioni asind poi.
" per le regioni de chebil. et carmen.
" e seiasten. et alexandria. et / hal-
" mainhedia. et orcab. et assemian
" Poi. passa per li. liti del mare al-
" bassara. ed e in esso quiui delle
" cipta la cipta astachar et Johor.
" et fese et sabor. et siren. et sitef.
" et cabene et senenir. et maruben.
" e passa per dioceses. alhaguez. et
" alhibrac. Et innesso e albassa. et
" gausit et begben et altufa. et
" alhenber. et sert. poi passa per le
" regioni de ascemi e e innesso delle
" cipta. la citta alhar. et sulumia. et
" dinis. et damascus. et seir. et
" accon. et tabaria. et cesarea. ella
" casa di santifichazione. et aram-
" lati. et aschalona. et gaza. et ma-
" dian. et alcuzum. Poi. sega. le
" parti di sotto della terra degipto
" e innesso. e alpharne et tapnis. et
" diamat. et sisatat degipto e alfium.
" et allexandria. Poi. passa per le
" regioni de barha. Poi. per le re-
" gioni dafricha. et innesso ella cipta
" alchiruen. e uiene al mare doc-
" cidente

" § Lo quarto clima si chomincia
" dalla parte doriente e passa per le
" regioni arebeit et poi. per corascen
" et sono innesso delle cipta. Ma-
" scieda et almisimati et fargana et
" Samarghat. et bela. et bochara. et
" haraha. et amria. et maruzudur.
" et ascheron. et sarers. et thedus
" e niscibar. et Jurgen e corais. et
" abansten. e dambedurum. et cor-
" duben. et heilen. arei e isphaen.
" e cheni. et eheridein e neudem e
" adheinur et huhauti. et searoz. et
" saramoz. e almosil / et talboch e
" nasabim et Enit. et capud fontis
" et calicule e scinsat e aran et ha-

" et transit per saydegipti et secat
" nilum et illic est in eo de ciuita-
" tibus ciuitas cabrum et hacunir et
" ansehe et astar. et azsabe et asim
" et afren. deinde transit in terram
" occidentis per medium regionum
" affrice deinde transit per regiones
" barbarorum et peruenit ad mare
" occidentis

" mare rubrum & transit per sagid
" egypti. & secat nilum & illic sunt in
" eo de ciuitatibus ciuitas cabrus et
" hacitun. & ansehe & astar. et
" acsabe & aisin & afren. Deinde
" transit in terram occidentis. per
" medium regionum affre. Deinde
" transit per regiones barbarorum &
" peruenit ad mare occidentis.

" § Clima uero tertium incipit ab
" oriente et transit per septen-
" trionem regionum sui et transit per
" regiones indie et est in ipso ciuitas
" alhinder deinde transit per septen-
" trionem regionum asind deinde per
" regiones kebil et karmen & se-
" rasten et alexandriam et almah-
" modia et ortab et aseraian deinde
" transit per litora maris albasara
" et est in eo ibi de ciuitatibus ciuitas
" astathar. et iohor et fese et sabor
" et sertem et scref et cabene et
" seuenir et maniben et nadit [sic]
" per dioceses. albaghac et al-
" chirach et in ipso est albassa et
" guaisit et bagded et alcufa et
" alember et seit Deinde transit per
" regiones asemi et est illic in eo
" de ciuitatibus albar et sulunna et
" hims et damascus et sur et acim
" et tabaria et cesaria et aisuf et
" domus sanctificationis et aranilati
" et aschalona et gaza et madian / et
" aculçum deinde secat inferiora
" terre egipti et in ipso est alphe-
" tine et tanis et damiat et stisatat
" egipti et alfaium et alexandria.
" deinde transit per regiones barcha
" postea per regiones affrice et in
" ipso est ciuitas alcharuen et per-
" uenit al mare occidentis.

" § Clima vero tertium incipit ab
" oriente et transit per septentrio-
" nem. regionum sin. & transit per
" regiones indie & est in ipso ci-
" uitas alhindher. deinde transit per
" septentrionem regionum assind.
" deinde per regiones kebil. & kar-
" men & seiasten & alexandriam &
" almacmodia. et orchab. & asera.
" ra. deinde transit per litora maris
" abbassara et est in eo ibi de ciui-
" tatibus ciuitas astachar. & iohor.
" & fese & sabor. & seren & siref.
" & chabene. & senenir. & maruben.
" & vadit per diocesos. / alhagueç. &
" alchirahc. & in ipso est albasa. &
" guasit & bagded. & alcufa &
" alember & soit. deinde transit per
" regiones ascemi. et est in illo illic
" de ciuitatibus alchar et sulimia. &
" huns & damascus. & sur. i. acre.
" & acon & tabaria. & cessura et
" arfuf. et domus sanctificationis. i.
" ieherm̄. et aranillati. et ascalonia
" & gaça & madian et aculçum.
" Deinde secat inferiora terre egypti.
" et in ipso est alphenne. et tanis
" et damuat & sisatat. i. celarium
" egypti. & alfauum et alexandria.
" Deinde transit per regiones africe.
" & in ipso est ciuitas alcharuen &
" peruenit ad mare occidentis.

" § Et clima .4 incipit a parte
" orientis et transit per regiones
" athebeit deinde per corascen et
" sunt in ipso de ciuitatibus ma-
" sceda. et asmisunati et fargana
" et samaxchant et belha et bocha
" ra. et haraha et anrina et maru
" zudur et asceien et saras et idus
" et nisabor. et uirgen et conus et
" trabasten et daubendimen et cor-
" duben et deilen et arei et hispaen
" et keni et henden et uenden et
" ademiz et hulium et sechuroz et
" saramoçe et almosil et talbed et
" nasabim et euid et caput fontis. &
" calicale & scinsat et haran et ha-

" § 4m Clima incipit a parte
" orientis. & transit regiones attebeit.
" deinde per chorascen & sunt in
" ipso de ciuitatibus masceda. &
" asmisimati. et fargana. & samar-
" chat & belha. & borbara. & haraba.
" & amuia. & maruçuduri. et asce-
" uen & saras et tdus et nisabor et
" uirgen et conus et tabarsten &
" dambedunen et corduben & deilen
" et arei. & ispaen & keni & keden
" et uenden. et adenuz et huluum
" talbed et nasaben et enid. et caput
" fontis. & calicale & scinsat & aran.
" et haracham & carbasie. deinde
" transit per septentrionem regio-

" fontis. & Calicule. & Scinsat. &
" aran. & harochach. & Carkisie. poi
" passa per Setentrione regioni asemi.
" & ene ennesso ine delecita Belis.
" & Marabeh. & Sinsat. & malchana.
" / & Tatain. & Aleb. & Cansitum
" & antiochia. & Tripuli & almasisa.
" & Saida. & Eclesia nigra. & açina.
" & Tarsus & amudia. Et poi passa
" ellomare ascemi sopra lisola del
" Cipro. & Rodo. poi passa ellaterra
" doccidente elleregioni de tange. &
" uene almare doccidente.

" § Lo quinto clima se comença
" daoriente elleregioni de Ogh e
" Magogh. poi passa per setentrione.
" chorascen. et ene ennesso ine dele-
" cita altuç. la quale e cita de mer-
" catanti. & Thukebet. & Churçine.
" & astiaba. & alsohesce. & altaru-
" bimde. & adrabigen. & dioceses.
" armenie. & Bardaha. & nesui. &
" Sceiascen. & ardon. & chalat. e
" passa leregioni deli Romani. sopra
" Carsana. & Carna. & roma grande
" poi passa per liliti delmare asceni.
" dala parte de setentrione. poi passa
" per leregioni deli spagnoli introe-
" tanto kelli uene elmare doccidente.

" Lo sexto clima secomença da
" oriente. & passa per leregioni Ogh.
" poi passa per leregioni alahoç. &
" sega per meço del mare Jurgen per
" fine aleregioni deliromani & passa
" per Jurgen. & menesce. & eraclea.
" & tali lakiamano alconduç. & Con-
" stantinopoli. & le regioni Burgen.
" & uene almare doccidente.

" § Lo settimo clima secomença
" da oriente ensetentrione. Ogh. poi
" passa per leregioni Aturch. poi per
" liliti del mare Jurgen. dala parte
" de setentrione e poi sega lo mare
" deliromani. e passa per le regioni
" Burgen. e deli Sclaui. euene al-
" mare doccidente.
" quello ke deppo questo clima
" per fine alcompiemento delluoco
" habetato ke noi auemo conusciuto
" se comença in oriente elleregioni
" Ogh. poi passa per leregioni almub-
" gar. & laterra arturch. poi passa
" per leregioni alban poi per artur.
" poi per sufen poi per li sclaui. &
" uene al mare doccidente ".

" rochach. et carchisie Poi. passa
" per settentrione regione ascemi ed
" e innesso quiui. delle cipta. belis
" et Malabech. et sinsat. et mal-
" chana. et tatain. et aleb. e can-
" situm. et antiochia. et tripuli. et
" almasisa. et saida. et eclesia nigra
" e azina. & tarsus. et mudia. Et poi.
" passa nel mare asciemi sopra lisola
" del cipro et Rodo. Poi passa nella
" terra doccidente elle regioni de
" tange e uiene al mare doccidente

" § Lo quinto Clima si comincia
" da oriente nelle regioni de ogh e
" magogh poi passa per settentrione
" chorascen Et ed e inesso quiui
" delle cipta altuz la quale e cipta
" di merchatanti. et thukebet. et
" curzine e astiaba. et alsohesce et
" altarubimde. et adrabigen et dio-
" cieses. armenie et bardaha e nesui.
" et sceiascen. et ardon et calat E
" passa le regioni delli. romani sopra
" Carsana. et carna. e roma grande.
" Poi. passa per li. liti del mare
" asceni dalla parte di settentrione
" poi. passa per le regioni degli. spa-
" gniuoli entra e tanto chelli uiene
" al mare doccidente

" § Lo sesto, clima sinchomincia
" da oriente e passa per le regioni
" ogh poi. passa per le regioni alaoz.
" et sega per mezo del mare Jurgen
" per fine alle / regioni delli. romanj
" e passa per. Jurgen. et menese. et
" eracleo. e tali. lo chiamano al-
" conduz. et costantinopoli elle re-
" gionj burgen. e uiene al mare
" doccidente

" § Lo settimo clima si chomincia
" da oriente en settentrione ogh poi
" passa per le regionj aturch per li.
" liti del mare Jurgen dalla parte
" di settentrione e poi. sega. lo mare
" delli. romani e passa per le regioni
" burgen degli. sclaui e viene al
" mare doccidente.
" § Quello che dipo questo clima
" per fine al chonpimento del luogo
" habitato che noi. auemo Cono-
" sciuto si chomincia innoriente nelle
" regioni ogh Poi. passa per le re-
" gioni almubgar. et alla terra ar-
" turch Poi. passa per le regioni
" alhan. et. alla magna poi per atur
" poi. per sufen. Poi per li sclauj. e
" uiene al mare doccidente ".

" recham et carsic deinde transit per
" septentrionem regionem ascemi et
" in ipso illic de ciuitatibus belis et
" mambeh et sinisat et maltana et
" zantara et aleb et casirim et an-
" thiochia. et tripolis et almasisa et
" saida et ecclesia nigra et azma et
" tharsus et amudia deinde transit
" in mare ascemi super insulam
" cipri et rodum deinde transit in
" terram occidentis

" num ascemi. et est in ipso illic de
" ciuitatibus belis & manbeh & si-
" nisat. & maltana & çantara. &
" aleb. & causurum & antiochia. et
" tripolis et almasisa. et saida. et
" ecclesia nigra. et açiua. et carsus
" & ainidia. deinde transit in mare
" ascemi. super insula incipri & erodii.
" dein transit in terram occidentis
" per regiones tange. & perenit ad
" mare occidentis.

" § Et quintum clima incipit ab
" occidente in regionibus ogh et ma-
" gogh. deinde transit per septen-
" trionem corascen et est in ipso
" illic de ciuitatibus altiem que est
" ciuitas negotiatorum et tukebet
" et choariçine et astiiaba et al-
" scesce et altarabinde et adrabigen
" et dioceses armenie et bardaha et
" nescin (?) et serasten et ardon et
" calat et transit in regiones roma-
" norum super carsana et cara. et
" romam magnam deinde transit
" per littora maris ascemi a parte
" septentrionis. postea transit per
" regiones hispanorum donec per-
" uenit ad mare occidentis.

" § Et 5^{m} clima incipit ab oriente
" in regionibus goh. & magoh. deinde
" transit per septentrionem charscen
" & est in illo de ciuitatibus illic
" alcres que est ciuitas negotiatorum
" & thukebet. & choariçme. &
" astuaba. & alscese. & altarabinde.
" & adrabigen & dioceses armenie.
" et bardaha. et nesui et siastes. &
" ardon & calat. et transit regiones
" romanorum super charsana &
" chara. & romam magnam. deinde
" transit per litora maris ascemi a
" parte septentrionis. postea transit
" per regiones ispanorum donec per-
" uenit ad mare occidentis.

" § Et sextum clima incipit ab
" oriente et transit per regiones ogh
" et magogh deinde transit per re-
" giones alhaoz et secat medium
" maris uirgen usque ad regiones
" romanorum et transit per uiren et
" menese et heraclia et alcodunz &
" constantinopolim et regiones bur-
" gen et peruenit ad mare occidentis.

" § 6^{m} clima incipit ab oriente &
" transit per regiones ogh. & ma-
" gogh. deinde transit per regiones
" alhaoç. & secat medium maris
" uirgen usque ad regiones roma-
" norum & transit per uire & manase.
" herachia. uel alcoduç & Constan-
" tinopolim & regiones burgen &
" peruenit ad mare occidentis.

" § Et septimum Clima incipit ab
" oriente a septentrione regionum
" ogh. postea transit per regiones
" athure. deinde per littora maris
" uirgen. a parte septentrionis. po-
" stea secat mare romanorum et
" transit per regiones burgen et scla-
" uorum et peuenit ad mare occi-
" dentis Quod autem est post hoc
" clima usque ad complementum loci
" habitabilis quem nouimus incipit
" ab oriente in regionibus ogh deinde
" trnsit per regiones alumbgar et
" terram ature [*or* " -c "] deinde per
" regiones alhan deinde per atir
" postea per sufen. deinde per
" sclauos et pervenit ad mare oc-
" cidentis ".

" § 7^{m} Clima incipit ab oriente
" septentrionum regionum. ogh. po-
" stea transit per regiones aturuc.
" deinde per litora maris uirgen a
" parte septentrionis. postea secat
" mare romanorum & pertransit per
" regiones burgen. Jsclauorum &
" peruenit ad mare occidentis. Quod
" autem est post hoc clima usque
" ad complementum loci habitabilis
" quem nouimus incipit ab oriente
" in regionibus ogh & magogh.
" deinde transit per regiones al-
" mubgar & terram atuith. deinde
" per regiones alha. i. alamannorum
" deinde per atir. postea per susen.
" deinde per sclauos & peruenit ad
" mare occidentis ".

As a sample of the translation by John of Seville, compare the Vulgate description of the Sixth Climate, and the rest to the end of the chapter, according to the reading of the *ed. princeps* — which the other two Vulgate editions follow closely — viz.:

" Differentia 9, end [fo. biii r°]: Sextum clima incipit in oriente " et vadit super regiones gog. postea vadit super regiones alior. & ab- " scindit medium maris iurgem vsque in regiones romanorum. va- " ditque per regiones burgon & solanorum & peruenit ad mare " occidentis. Quod autem sequitur hoc clima vsque in expletione " loci habitabilis que nouimus. incipit ab oriente ex regionibus gog. " deinde vadit super regiones Arphagar & terram a corde. Deinde " vadit super regiones alheem. postea super atir. deinde super mar- " gem. postea super darios. & peruenit ad mare occidentis " [1].

Several things are notable in the above parallels:

1. The Chigian text of this difficult passage is close enough to the readings in the Ricc. 2164 to give pause to those who dismiss the former Ms. as of no critical value [2].

2. The displaced sentence at the end of the passage on the First Climate shows Ristoro's original to have belonged to the same group of Mss. as did the Laur. Ms. [3].

3. In the matter of spelling, however, now the Bodl. Ms. and now the Laur. Ms. is the closer to Ristoro.

Ristoro was, therefore, using a Ms. of the version by Girard of Cremona which:

1. had the figures for the obliquity of the ecliptic corrected to 23° *51'*, as in the Arabic original (whereas the Laur. and the Bodl. Mss. have 23° *41'*);

2. belonged, with the Laur. Ms., to a group which had a no-

[1] The Seventh Climate, it will be seen, has disappeared entirely in the Vulgate. — The corresponding passage in Christmann is: Caput XI end [p. 47]: " Sextum " clima incipit ab oriente & transit regiones Gog & Magog, & Alazoh, secatque " medium mare Iurgem vsque ad regiones Romanorum, & transit per Iuren, Me- " nese, Eradia, Constantinopolim, & regiones Burgen, & peruenit ad mare occi- " dentale.

" Septimum clima incipit ab oriente, & a parte septentrionali regionis Gog " transit per regiones Turciae, & littora Iurgen a parte septentrionis: postea secat " mare Romanorum, & transit per regiones Burgen & Sclauorum, atque sic per- " uenit ad mare occidentale.

" Quod autem est post hoc clima vsque ad complementum loci habitabilis, " quantum nos nouimus, incipit ab oriente in regionibus Gog, deinde transit per " regiones Alleceti & Abmugor, & terram Turciae: postea vadit per regiones Alahin, " deinde per Tyr, postea per Fusen, deinde per Sclauos, donec perueniat ad mare " occidentale ".

[2] e. g. Adolfo Bartoli, *Storia d. Lett. Ital.*, Firenze, 1880, vol. III, p. 176.

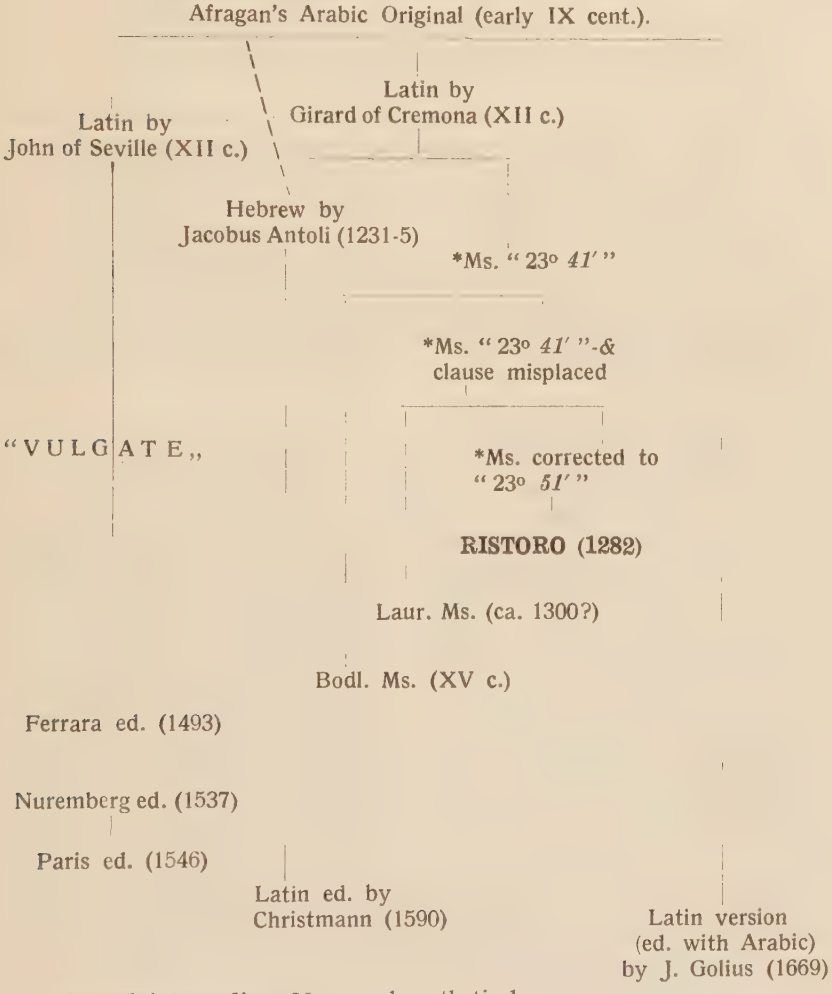
[3] V. supra, pp. 19, 18. — Campani, ed. cit., pp. 94-5, has, without comment, removed the sentence from the place which it occupies, in the Ms. he is professing to edit.

table displacement of the last sentence in the description of the First Climate;

3. often followed more closely the spellings found in the Bodl. Ms. than in the Laur. Ms.; but

4. differed in various minor ways from either of these two Mss.

Schematically, the chief versions and editions mentioned above may be arranged as follows:



* Starred intermediary Mss. are hypothetical.

The long chapter from Alfragan treated above is unnumbered in Ristoro, who calls it " Capitolo singulare ", and is inserted between Chapters 11 and 12 of the Fifth " Distinzione " of Book II. At the

very end of Chapter 11, and, therefore, immediately preceding the chapter on Geography, Ristoro has said — according to Ricc. 2164:

Lib. II, Dist. v, cap. 11, end [fo. 34 v°, col. 1]: " ..... e secondo " questa uia auemo laterra scoperta laquarta parte e empercio li " saui la chiamaro quarta habitabile. Adonqua de rascione lomare " dea comprendare le fini del primo clima dalaparte del meço die " daoriente ad occidente Et inpercio lafragano [sic] pose elloctauo " capitolo ke quello ke trapassa lotermine del primo clima dalaparte " del meço die lomare locomprende e non li so molte abetationi. Et " auemo laterra scoperta come la figura delaluna quando noi laue- " demo meça ".

(Another statement of part of the above, with the same definite reference to Alfragan by chapter, has already been quoted, at the end of the passage from Averroes[1]: " Et noi trouamo secondo ke " ponon li Saui especialmente l a l f a g r a n o e l l o c t a u o c a p i- " t o l o k e l m a r e c o m p r e n d e l o p r i m o clima loquale " c o n f i n a c o l l o e n c o m e n ç a m e n t o d e l l a p a r t e d e l " m e ç o d i e d a o r i e n t e a d o c c i d e n t e ").

Girard of Cremona's version of Alfragan, on this point, is: " *Ca-* " *pitulum* 8 ", middle:

Bodl. Ms. (49 v°, col. 1):

" ..... Diuisa autem sunt loca in ha- " bitata huius parte habitabilis. in " septem diuisiones que sunt septem " climata § Medium primi quorum " transit super loca quorum proli- " xioris diei longitudo est 13. horarum " Et septimi medium transit super " loca quorum prolixioris diei longi- " tudo est. 16. horarum § Nam illud " quod pertransit terminum climatis " primi ad partem meridiei mare com- " prehendit et non sunt nulle [sic] ha- " bitationes in ipso Et in eo quod per- " transit climatum septimum ad se- " ptentrionem pauce etiam sunt ciui- " tates note apud nos ".

Laur. Ms. (7° r°):

" ..... Diuisa autem loca sunt in habi- " tata huius quarte habitabilis in 7 " diuisiones que sunt 7 climata. Me- " dium primi quorum transit super " loca quorum prolixioris diei longi- " tudo est 13 horarum. et septimi " transit medium super loca eorum " [sic] prolixioris diei longitudo 16 ho- " rarum. Nam illud quod pertransit " terminum climatis primi ad partem " meridiei mare comprehendit et non " sunt multe habitationes in ipso et " in eo quod pertransit clima. 7 ad " septentrionem. pauce etiam sunt ci- " uitates note apud nos ".

It is well worth noting that this (8th) chapter referred to in Alfragan is followed by the one on Geography (chap. IX) — while Ristoro's reference to the first is immediately followed by his translation from the geographical chapter.

It is evident that Ristoro was following Alfragan, here, not only for facts and quotations, but also to some extent for method and arrangement.

[1] V. supra, p. 11.

Other citations of Alfragan follow:

RISTORO, Lib. II, Dist. VIII, Cap. 3, toward end [Ricc. Ms. 2164, fo. 50 r°, col. 1]: " ..... empercio kelaterra e si picola ke non se sente " a respecto dela grandeça del cielo. et secondo ke posto per li Saui " solamente lo sole e cento sesanta esette e quarta e octaua piu de- " laterra. e secondo ke posto per loro tali so delestelle fixe ke so " nouanta cotanto magiuri delaterra. etali so magiuri settanta e " doe uolte cotanto. etali so magiuri cinquanta e quatro cotanto etali " so treta [sic] esei uolte cotanto Esecondo ke posto perli Saui la " menore stella ke seuede ella spera delestelle " fixe ediciotto cotanto delaterra. secondo ke " testimonia lalfagrano elli vinti edoi capitolo " del suo libro. Vnde none comparatione la gradeça del corpo " del cielo alaterra..... ".

And we find, in fact: ALFRAGAN, Cap. XXII.

Bodl. Ms. (55 r°, col. 1):
" ..... Et omnis stella que est in ma- " gnitudine sexta est minor stellarum " que uidentur quas possibile fuit pro- " bare equalis terre decies et octies... ".

Laur. Ms. (fo. 18 r°):
" ..... Et omnis stella earum que sunt " in magnitudine sexta est minor stel- " larum que uidetur quas possibile " sit probare equalis decies & octies " terre... ".

RISTORO, Lib. I, Cap. 12, middle [Ricc. Ms. 2164, fo. 5, r°, col. 1]: " ..... Alfagrano pone ello terciadecimo capitolo del suo libro. ke " quando luna e ella parte desopra del suo epiticlo [sic] se moue " enuerso ocidente. & quando ella e ella parte de sotto se moue enuerso " oriente. Adonqua semoue ella acontrario delialtri planeti..... ".

The text of Alfragan, in the chapter cited, is:

ALFRAGAN, Cap. XIII:

Bodl. Ms. (51 v°, col. 1):
" ..... Luna autem habet quinque " motus reuolubiles De quibus est " quod corpus lune reuoluitur in orbe " reuolutionis et reuoluitur in ipso cum " est in parte eius suprema. ab oriente " ad occidentem Et quando est in " parte inferiore ab occidente ad o- " rientem..... ".

Laur. Ms. (fo. 11 r°):
" ..... Luna autem habet 5 motus re- " uolubiles de quibus est lune corpus " reuoluitur in ipso cum est in parte " eius suprema ab oriente ad occi- " dentem & quando est in parte infe- " riori ab occidente ad orientem..... ".

Finally Alfragan is cited in the *Composizione del Mondo* I, 23 (again by chapter — making a total of five such citations, out of seven in all):

Lib. I, Cap. 23, near beginning [Ricc. Ms. 2164, fo. 9, v°, col. 1]: " ..... fuoro tali ke diceano keaçona perusta era sutto lequatore. " & lauerita combatte colloro. & dice ke sotto lequatore e dogne

" tempo uguale lo die collanocte. & tempera ine lafredura delanocte. " si ke liedogne tempo uguale lofredo collocaldo. empercio ke tanto " li demora lo sole sotto terra quanto sopra terra. si ke remane quello " loco temperato. Et l a l f a g r a n o p o n e e l l o s e x t o c a p i- " t o l o k e l [sic] q u e l l o l o c o e a b e t a t o. Et a u i c e n n a " & a l t r i s a u i ke cercaro la temperança dela terra p o s a r o " q u e l l o l o c o p e r l o p i u t e m p e r a t o § lauerita dice & " pone ke laçona perusta dea essare per rascione en quello loco la " oua lo sole sopra capo & falli lomagiure die & menore nocte..... ".

Compare ALFRAGAN, Cap. 6:

Bodl. Ms. (48 v°, col. 1):

" ..... Insumma uero eorum que ac- " cidunt in locis habitabilibus terre " incipiamus a c i r c u l o e q u a- " l i t a t i s q u i e s t i n i t i u m " t e r r e q u a r t e h a b i t a b i l i s " i n t e r r a ab eo quod sequitur me- " ridiem § Dicamus ergo quod reuo- " lutio equatoris diei super omnes qui " h a b i t a n t i n i l l o c i r c u l o " est super summitatem capitum ne- " cessario..... ".

Laur. Ms. (fo. 5 r°):

" ..... In summa uero eorum que " accidunt in locis habitabilibus terre " incipiamus a c i r c u l o e q u a l i- " t a t i s q u i e s t i n i t i u m t e r- " m i n i q u a r t e h a b i t a b i l i s i n " t e r r a uel in latitudine ab eo quod " sequitur meridiem. dicamus ergo " quod reuolutio equationis diei super " omnes qui h a b i t a n t i n i l l o " c i r c u l o est super summitatem " capitum necessario..... ".

VI. AVICENNA (980-1037).

Ristoro's single mention of Avicenna is in the passage above last quoted. Its source may well have been the following statement from the widely known *Liber Canonis* [1] [p. 8]:

Lib. I, Fen I, Doctrina III, *de complexionibus*, Cap. I: ..... " Cumque " regiones attenderimus, certificatum erit nobis, quod si fuerit " l o c u s, qui inhabitabitur s u b e q u a t i o n e d i e i: neque aliqua " de rebus terrenis obuiando impedierit, uidelicet montes aut maria: " o p o r t e b i t i b i h a b i t a n t e s, a e q u a l i t a t i certę p r o- " p i n q u i o r e s e x i s t e r e, q u a m a l i c u i u s r e g i o n u m ".

The subject of this passage is discussed at some length in the context, as well as in Lib. I, Fen II, Doct. II, Cap. 8, *De accidentibus aeris impressionibus, quae non ualde cursui naturae contrariae existunt* [p. 63]; where his conclusion on this point is stated in less extreme form: " ..... Quapropter pro sententia tenendum est, quòd " terrae, quarum latitudines sunt propinquae declinationi toti,

[1] I have used the Basileae 1556 ed., which the title page shows to have been corrected, from the translation of Girard of Cremona, by reference to an Arabic version; but by comparison with the Laur. Ms., Cl. XV, Cod. 84, I have been able to control the text.

" omnibus terris sunt calidiores: & post ipsas, illae quae ab ea in " duobus elongantur lateribus ad partes duorum polorum, quanti- " tate quindecim graduum. In linea uerò aequinoctiali " non est calor illius superfluitas, quam facit " oppositio circa reuolutionem capitis cancri " in locis habitatis".....

An interesting possibility is that Ristoro got the material for this citation indirectly, through Averroes; for in the very same chapter from which I quoted above in dealing with Ristoro's mention and citation of Averroes — i. e. the latter's commentary on *Meteora*, II, 2 (" De ventis ,.) — we read: " ..... Et dicamus quod Aris. & secta " peripateticorum putant quod locus in quo est possibilis habitatio " in terra ex parte solis est illud quod est circa duas partes circuitus. " eius in duabus partibus eius. s. septentrionali & meridionali: & " quod illud quod est sub equinoctiali & prope ipsum impossibilis " est habitatio in eo propter dominium caloris: & etiam putant quod " illud quod est remotum a circuitu solis ad duas partes. s. meri- " dionalem & septentrionalem est inhabitabile propter dominium " frigiditatis. Ptolomeus autem & sequentes ipsum ex mathematicis " putant quod habitatio est possibilis sub equinoctiali ad illud quod " excedit ex parte meridionali secundum mensuram: que non vadit " ad ipsam depressio solis seu oppositu augis. Et est locus quem " vocant viam [sic] combustam. Auicenna autem iam secutus est eos " in hac opinione: & videt quod ille locus s. qui est sub equinoctiali " est magis temperatus seu medius omnibus climatibus & putauit " quod sermo peripateticorum est contrarius sensui & rationi..... ".

There are a number of indications that this passage may be Ristoro's source: (1) its proximity to the accredited citation of Averroes; (2) the evident explanation which it offers in its " Avicenna " autem iam secutus est eos in hac opinione " for Ristoro's " Avi- " cenna & altri savi "; (3) the use of the term " via [sic] combusta " — " via " is clearly a mistranslation, miscopying, or misprint, for *zona*, and the adjective may have been slightly twisted to fit the mistake, from an original " perusta " [1] (*via combusta* means regularly the Milky Way); cfr. Ristoro's " çona perusta "; and (4.) the very fact that Ristoro differs with Averroes; for the passage I have above cited from the latter is immediately followed by a confutation, and, as seen in the Italian citation, Ristoro agrees with Avicenna [2].

[1] Cfr. e. g. ALBERTUS MAGNUS, *Lib. de Natura Locorum*, Tract. I, Cap. VI (Vol. 9, p. 538, of *Op. omnia*, Paris, 1890-98): " ..... terram totam dividi in quinque " zonas celi..... quarum mediam vocant perustam sive torridam..... ".

[2] But in contrast with the above evidence cfr. the following sentence from ALBERTUS MAGNUS, *Lib. de Natura Locorum*, Tractatus I, Cap. XI (Vol. 9, p. 550): " Est autem alia temperatura inter duo çalidissima, sicut diximus supra, quorum

VII. Albumasar (805/6-883).

Ricc. 2164, fo. 2, r°, col. 2, reads:

Lib. I, cap. 4, middle: " ..... § Lalibra significo..... &c..... questo " loco del celo a cascione delibilance ke soine potaremolo kiamare " loco de iustitia & de santita. § En questa parte del cielo come en " questo segno uedemo una strada aselciata & sofolta destelle & lu- " minosa la quale se destende per locelo uenendo dalaparte del meço " die & passando quasi per final polo del septentrione. Et albo- " masar dice & pone kella tene per lolato dali " diciotto gradi delalibra per final terço grado " delloncomençamento del scorpione. & foro saui ke " la kiamaro uia combusta. & tali la kiamaro galasia ".

The original of this reference is tucked away, in a purely incidental manner, in the chief work of this great astrological writer, Albumasar: the *Introductorium Maius*. I quote from the Laurentian Ms., Plut. XXIX, Cod. XII (XIV century), of the translation by John of Seville [1]. The chapter in which it appears is treating of the " For-

" calidissimorum unum est sub tropico aestivo, et alterum sub hyemali: et tunc " temperatura erit sub aequinoctiali aequaliter ab utroque distante: et hanc " quidem temperaturam Avicenna et quidem alii vocari " simpliciter temperaturam dicunt, eo quod nullus in " mundo locus adeo sit temperatus, sicut locus qui est " sub aequinoctiali. Quod ita esse ego non consentio ".....

I have examined Albertus Magnus' works carefully; and while at first sight many passages seem to find striking parallels in Ristoro, a study of the context has always caused me to doubt the existence of a direct connection between the two. In this particular case there are some suggestions of a (lost?) reworking of a (pseudo-?) Ptolemaic work by Avicenna, underlying both Averroes and Albertus Magnus; for: (1.) as seen in the quotation given above, Averroes makes Avicenna of the opinion of Ptolemy, *inter al.*; and (2.) Albertus Magnus, Cap. VI of Tract. I of the *Liber de Natura Locorum*, in discussing this same question couples Avicenna's name with Ptolemy in each of the passages in which he refers to the former; the first, vol. 9, p. 540, reading: " Sunt autem Ptolemaei et Avicennae rationes in " contrarium. Dicunt enim isti, quod nos videmus multos homines oculis nostris qui " habitaverunt inter tropicum aestivum et aequinoctialem: et libri Philosophorum " de astris ibi degentium venerunt ad nos. India enim et Aethiopia in parte est " in illis locis. Et ex hoc constat oportere ibi esse habitationem: multae enim civi- " tates gentis Achim et Indorum et Aethiopum in parte constat nobis in climate " illo esse ". — In the second, Vol. 9, p. 541, he says: " Et haec est de locis illis " Avicennae et Ptolemaei in libro de *Divisione locorum habitabilium* ". Then, in cap. VII, p. 543, we find: " Ptolemaeus autem in libro de *Dispositione sphaerae* " qui est introductorius *Almagesti*, dicit sub utroque tropico, aestivo scilicet et " hyemali, habitare Aethiopes..... ". I can find no such work either by Ptolemy or by Avicenna; but I suspect that the clue to the tangle may be in the supposititious *Lib. Introductorius ad artem sphaericam* of Geminus, ascribed to Ptolemy and prefixed as an introduction to his great work (later translated by Girard of Cremona; v. Steinschneider, in *Wien Akad., Sitzungsber.* (phil.-hist. Kl.), vol. 149, 1904, IV Abhandl., p. 19). — Did Avicenna write a commentary to it?

[1] This work has never been printed; v. Steinschneider, in *Wien Akad., Sitzungsber.* (phil.-hist. Kl.), vol. 149, 1904, IV Abhandl., p. 47. The *Introductorium*

" tunes " of the planets: " Tractatus VII, Differentia VI ", beginning: " [F]ortune vero planetrum est ut sint..... " and in explaining the various degrees of such Fortunes, the text enumerates many situations in which planets are " weakened " and " hindered "; one of these is that they be in the Milky Way: " ..... vel sint in una [sic] " combusta. i. in libra & scorpione. & eo grauius si fuerint ab octauo " decimo gradu libre. in tertium gradus [sic] scorpionis..... ".

The miscopied *via* (combusta) appears in its correct form a little farther on, where in speaking of the eleven ways in which the Moon may be " impeded ", the text reads: " ..... Octauo est fuerit in uia " combusta. i. in libra vel scorpione ".

Ristoro cites Albumasar a second time: Ricc. 2164, fo. 15, v°, cols. 1-2:

Lib. II, Diff. I, Cap. 6, towards end: " ..... et auemo asegnata " larascione e la cascione perke laluna elosole ciaskeduno abe solo uno " segno. § A l b o m a s a r loquale fo altissimo maestro. ne pose e asegno " altra sua rascione e d i s s e k e l i p l a n e t i k e r e t r o g r a d a- " u a n o c i a s k e d u n o d o u e a a u e r e d o i s e g n i. u n o l a o " e l l i r e t r o g r a d a s s e. e l a l t r o l a o e l l i s e d i r i ç a s s e. " e per / questo pare ke uollia dire kelo planeta non possa retrogradare " e diriçarese in uno segno Et gia auemo molte uolte trouato lopla- " neta retrogradare e diriçare in uno segno e pose perke la luna e " losole non retrogradauano ciaskeduno auea solo uno segno Li Saui " posaro e acordarse tutti ke laluna auea epiciclo e ua super esso " esella a epiciclo e ua super esso mistieri kella retrogradi e dirictise " come li altri planeti. e quando ella e retrograda. e kiamata tarda " cursu adonqua sella retrograda secondo colui dea ella auere doi " segni. o quella sua rascione e uana..... ".

The *Introductorium Maius* elucidates (?) this point in the following passages:

Tractatus V, Differentia II: " [Q]uia antiqui omnes concorda- " uerunt quod aries. & scorpio domus martis. Et taurus. ac libra

in Astronomiam Albumasaris Abalachi VIII continens libros partiales, Venice, 1489) 1506, 1515, &c. (v. *Bibliographie Gén. de l'Astronomie*, vol. I, 1887, pp. 702-3, n° 3820), seems to be a sort of compendium of the same subject, put into Latin by Hermannus Dalmata (XII cent.): v. STEINSCHNEIDER, loc. cit., p. 34 — no reference whatever to the Milky Way is made in this version. — Of Latin translations of the many other works on astronomy and astrology attributed to Albumasar (v. STEINSCHNEIDER, loc. cit., vol. 151, 1905, I Abhandl., pp. 35-8; and *s. v. Ma'schar*, in index, pp. 100-1; *Bibliog. Gén. de l'Astron.*, vol. I, pp. 702-5) only two have been printed: (1) *Flores astrologiae*, Aug. Vind., 1488, &c., (copy in National Library (Palatine), Florence), & (2) *De Magnis Conjunctionibus* &c., Aug. Vind., 1489, (copy in Columbia Univ. Library). Neither of these shows any passage which might be considered the source of the above citation, nor of the one to follow in the next section.

" domus veneris. & gemini. ac. uirgo domus mercurii. & sagitarius &
" piscis domus iouis. & capricornus & aquarius domus. Saturni. leo
" domus solis. & cancer domus lune. Qua de causa his planetis discordia
" & diuersitas est apud eos in hoc ". Having thus put the question: why the Sun and Moon should have but one Sign apiece, while the other planets were " housed " in two, each; the opinions of various authorities, especially Ptolemy, are reviewed.

Diff. IV, begins: " [T]vnc uellemus scire quid esset planetis vii.
" ex duodecim signis. aspeximus. & i n u e n i m u s u n i c u i q u e
" p l a n e t a r u m q u i n q u e d u a s f i g u r a s. & duas longi-
" tudines & diuersas ut ortus. & occas. & r e t r o g r a d a t i o. a c
" d i r e c t i o. & non inuenimus unicuique luminarium preter unam
" domum congruam figure eius " ..... *i. e.* the two great " Lumina-
" ries " have not the various pairs of aspects which appertain to the other five planets, and therefore but one " house " suffices for each; and in that lies strength: " Et ideo sunt fortiora ". — Then more explanations of the housings are discussed, at much length; and then the author takes up each planet separately, and treats more definitely of the dual nature of the five planets, and the relation of this to their double housings.

The matter of progression and regression as related to these planets is brought out more specifically in the following passage:
" ..... facta est soli pars inomni signo masculino. et lune in omni signo
" feminino. Planetis vero. v. non est ita. quia est uni planete pars in
" utrisque domibus suis tantum in masculino. s. & feminino. Et
" propter fortitudinem luminarium & quia unicuique eorum est una
" figura. & una domus. factum est unumquodque eorum in domo sua
" significans figuram temperamenti. & compositionis. & incrementi.
" Ceteri uero planete sunt his e contrario. quia sunt unicuique eorum
" due figure. & due longitudines & ipse in una domorum suarum si-
" gnificant figuram directionis & ortus aptationis quoque & tempe-
" ramenti. Jn altera vero domo. significat figuram retrogradationis.
" & occasus. ac diminutionis temperamenti. Saturnus itaque in capri-
" corno significat figuram retrogradationis. & occasus. propter concor-
" diam frigoris ac siccitatis eorum. & in aquario significat figuram
" directionis atque ortu. [sic]. Et iupiter in sagitario significat figu-
" ram directionis. & ortus. E in pisce significat figuram retrograda-
" tionis & occasus. Et mars in scorpione significat figuram directionis
" propter complexionem humiditatis scorpionis eius. Et in ariete
" significat figuram retrogradationis propter coniunctionem caloris
" eorum & siccitatis. Venus uero in tauro significat figuram apta-
" tionis. & directionis atque occasus. quia occasus fortior est ei. &
" magis conueniens. Et in libra significat figuram retrogradationis
" & initium ortus. Et mercurius i [sic] uirgine significat directionis.

" & occasus & in geminis significat figuram retrogradationis & " ortus ".

The above is, in places, somewhat obscure; but the general drift is as I have tried to show, and as Ristoro's statement indicates. The reasoning stands out much more clearly in the following summary, found in the text of one of the printed editions already mentioned: *Introductorium in astron..... VIII continens libros partiales*, Venice 1506, on r°-v° of lst fo. after " d 4 ":

Book V, Chapter 4, " De stellarum domicilijs ": " .....: 5. s t e l- " l a r u m b i n a s c u i u s q u e f i g u r a s d i u e r s a s i n u e n i m u s " vt quidem nunc orientales nunc occidentales fiunt n u n c r e t r o- " g r a d e n u n c d i r e c t e: luminum vero singulas. Nec enim " vnquam sol orientalis fit nec occidentalis. v n d e q u i n q u e s t e l- " l a r u m b i n a c u i u s q u e d o m i c i l i a f o r e b i n i s a d a p t a " i n t e l l e x i m u s luminum vero vt figure simplicis erant singula... " / ... solis quidem in omnibus signis masculis: lune vero in omnibus " femineis virtus viget per que forma simplici domicilia singula: " ceteris vero b i n a p r o f i g u r i s b i n i s. A l t e r u m i n h o c q u o d " o r i e n t a l e s & d i r e c t e s u n t ; a l t e r u m i n e o q u o d o c- " c i d e n t a l e s & r e t r o g r a d e a c c o m m o d u m.....". If I knew how otherwise to account for Ristoro's first citation of Albumasar, I should certainly hesitate to accept the *Introductorium Maius* as even a possible source of his second reference; but should consider it almost self-evident that his authority was the shorter version, with its almost incomparably greater clearness.

VIII. Zahel (early ix century).

Ricc. 2164, fo. 2, v°, col. 2:

Lib. I, cap. 6, beginning: " Capitolo Sexto. de ladispositione et " delordene doppio deli dodeci segni. Trouamo uno grande ordene " seguire elli dodeci segni. secondo lo detto deli Saui ke posaro & " parlaro decio. ke uno segno e masculino & laltro feminino. et a " questo fa testimonio Ç a e l e l l o n c o m e n c a m e n t o [sic] d e l " s u o l i b r o. & p o n e & d i c e S c i t o q u o d s i g n a s u n t " d u o d e c i m & e x e i s S e x s u n t m a s c u l i n a & s e x s u n t " f e m i n i n a A r i e s e s t e r g o S i g n u m m a s c u l i n u m e x " s i g n i s d i e i. & T a u r u s f e m i n i n u m e x s i g n i s n o c t i s " & s i m i l i t e r s u c c e d i t m a s c u l i n u m f e m i n i n u m. & " f e m i n i n u m m a s c u l i n u m u s q u e i n f i n e m s i g n o r u m. " & u e d e m o e l l a t e r r a l i a n i m a l i q u a s i a b i l a n c i a t i l i m a s k i c u m " l e f e m e n e..... ".

This authority is not Algazel, as Narducci, misled by the mar-

ginal note " aliter agazel " in the Chigian Ms., interpreted it [1]; nor " Gael " — whoever that might be, as Bartoli (op. cit.) Vol. III, p. 333, printed it, from this same Ricc. 2164; — but is an Arabic astrologer of the IX century whose works were very widely known, and whose name was distorted in various transliterations till it had run through an astounding series of transformations extending from " Çahel " to " Hombschir " [2].

The exact work referred to by Ristoro is the *Introductorium de Principiis Judiciorum*; this was printed at Venice 1484, 1493, 1519, in a collection of astrological works headed by the *Liber Quadripartiti Ptholemei* [3] — and begins with the passage Ristoro has quoted (fo. 122 v°, col. 1):

" § Incipit introductorium de principijs iudiciorum Çahelis
" ysmaelite. Capitulum Primum de diuisione signorum & de triplici-
" tatibus [I]n nomine dei pij & misericordis: Dixit çahel bembiç
" ysmaelita. § Scito quod signa sunt. 12. & ex eis. 6.
" sunt masculina &. 6. femi. Aries ergo est signum
" masculinum ex signis diei. & taurus femininum:
" ex signis noctis: & similiter succedit masculino
" femininum: & feminino masculinum vsque in fi-
" nem signorum [4]: & ex eis sex sunt signa directe ascendentia.
" i. habentia directum ascensum: & ex eis. 6. sunt tortuose ascen-
" dentia. i. ascensum habentia tortuosum ".

[1] V. his ed., pp. 7, 178; — the form in the text of Chig. is " zale ".

[2] V. STEINSCHNEIDER, in *Zeitschr. d. Deutschen Morg. Gesellschaft*, vol. 54, 1900, p. 39.

[3] There is some discrepancy between the titles ascribed to Zahel in this edition (*De Interrogationibus*; ejusdem *De Electionibus*; ejusdemque *De Temporum Significationibus in Judiciis*) and the treatises themselves, which are printed one after another without normal separation; on this v. STEINSCHNEIDER, loc. cit., p. 41-2. — Albertus Magnus, as I shall note later, refers to the particular treatise in question as *Introductio* Zahelis; and the corresponding title will be found in the quotation about to be given. — The dates of the editions are those given in the *Bibliog. Gén. de l'Astron.*, I, p. 390, n° 743; — I used the copy of the 1493 ed. found in the Biblioteca Nazionale (Palatina), Florence.

[4] The mention of this treatise made by Albertus Magnus does not carry the quotation so far: *Speculum Astronomicum* (in *Op. omn.*, vol. 10, 1891, p. 636): " Caput VI, *De nominibus librorum deservientium parti astronomiae judiciariae.....* ". § 4: " Et est etiam introductio Zahelis, qui sic incipit: *Scito, quod signa sunt duodecim* ".

The text I have quoted above from Zahel is much closer to Ristoro's than is that found in the Laur. Ms. Plut. XXX, Cod. XVII (XIII cent.): " liber zaelis In-
" troductorii et de questionibus & de ellecionibus horarum & de temporibus Scito
" quod signi sunt. 12 Et ex eis sex sunt Masculina & sex feminina. Aries est signum
" Masculinum diurnum Taurus femeninum nocturnum et consequenter fiat suce-
" siue [?] secundum ordinem signorum ".

The opening words of this Treatise in other Mss. may be found in the *Brit. Mus. Class. Catalogue of Mss.*, vol. 96, Astronomy & Astrology, p. 135: Sl[oane] 311, 332, 620; also in the *Cat. Codd. Mss. Bibl. Bodl.* — Codices Digbeiani, p. 79: Cod. 72.

IX. Isidore of Seville (570-636).

Of the authorities cited directly by Ristoro, the only one whose original work was in Latin, is Isidore of Seville [1]. This author is mentioned in what is probably the best known chapter of the *Composizione del Mondo* [2] - an unnumbered chapter, like the one translated from Alfragan, and, like that one, a pendant to the one that precedes [Lib. II, Dist. VIII, Cap. 4]:

(Ricc. 2164, fo. 50 r°, col. 2-v°, col. 1) " Capitolo dele uasa antike. " Dake noi auemo facto mentione delaterra uolemo fare mentione " del nobellissimo e miraculoso artificio ke fo facto dessa. de la quale " feciaro uasa per molti temporali li nobilissimi eli sutilissimi artifici " anticamente ella nobele cita darecço ella quale noi fommo nati. la " quale cita secondo ke setroua fo / kiamata Orelia. emo e kiato [sic] " arecço. de liquali uasa mirabili per laloro nobilita certi saui " ne feciaro mentione elli loro libri comefo esy- " dero. esidilio liquali feciaro de terra collata sutillissima come " cera. e deforma perfecta in ogne uariatione ".

Isidore, as will be seen below, also mentions Sedulius in this connection:

Originum sive Etymologiarum, Liber XX, Cap. IV, *De vasis escarum*, § 5 [3]:

" Aretina vasa ex Aretio municipio Italiae dicuntur, ubi fiunt,

[1] The reference to St. Ambrose found in the Chigian Ms., fo. 50 r°, col. 1 — in the section misnumbered " Lib. III ", Cap. 7, instead of *Lib. II, Dist. II*, Cap. 7 (v. Narducci, op. cit., p. 227) — is absent from Ricc. 2164. It is a rather extended quotation, and sounds out of harmony with the context; I give the passage according to the text of Ricc. 2164 (fo. 24 v°, col. 2), with the Chigian additions in brackets: " Capitolo settimo delaluna e delo suo segno edeli significationi e deli " effecti suoi & deliorbi suoi colle sue casione. Vediamo se ello regno dea uenire " piu gente. o selli e uenuta tanta quanta ne mestieri. § Et gia so uenuti per rascione " sei capetani ello regno colloro gente deliquali uenne saturno en prima colli soi lauo- " ratori dellaterra. e Jupiter colli suoi religiosi e colli soi amunitore dela fede. e poi " uenne Mars colli soi caualeri. e poi uenne lo sole loquale ekiamato Ree. [*Et secondo* " *il decto di santo anbruogio doctore il sole si e ochio del mondo. Allegrecça del die* " *Bellecça del cielo misura de tempi uirtu et vigore di tucte le cose ke nascono in terra* " *et in acqua et perfectione di tucte le stelle*] e [*dipol sole*] poi uenne Venere colli omini " de corte e colle sue donne. e poi uenne Mercurio colli soi filosofi e colli soi saui e " colla scientia detutte larti..... ". The effort to recover the loose thread of the context, after the quotation from St. Ambrose, is evident; and there seems little doubt that the non-Riccardian portion is an interpolation. Narducci, op. cit., p. 65, n. 1, in this case takes the pains to present the original text.

[2] For references to this chapter, and quotations of all or part of it, v. Narducci, op. cit., pp. xliii sqq. (Documenti I, II, IV, VI, VII, VIII, p. lxi of IX, X, n., XI, XII, pp. lxxvi-lxxviii of XIV). Monaci, *Crestomazia italiana dei primi secoli*, Città di Castello, fasc. II, 1897, pp. 366-8, also prints it (from the Ricc. Ms. 2164; but with some inaccuracies).

[3] Lindemann, *Corpus Grammaticorum Latinorum veterum*, tom. III, p. 623.

" sunt enim rubra. De quibus Sedulius: *Rubra quod appositum testa* " *ministrat olus* ".

X. Sedulius (fl. ca. 470).

A glance at the source of Isidore's quotation from Sedulius shows that the latter makes no reference to Arezzo, nor to Aretine vases by name, but simply to the humble red earthenware bowl, contrasted in a metaphor with the gold plate and jeweled castors of rich tables. It is in the *Praefatio* to his *Paschale Carmen*, and he invites the reader as his guest, not to the sumptuous tables of learned doctors,

" At nos exiguum de paupere carpsimus horto,
" Rubra quod adpositum testa ministrat, holus " [1].

There is, therefore, not the slightest reason to believe that Ristoro used Sedulius directly.

XI. Artephius (xii century?).

In discussing the " reason " for the existence of a right and a left side in animals, Ristoro, after contemptuously dismissing the argument based on the position of the heart, says:

Lib. II, Dist. vi, Parte IV, Cap. 4, near beginning (Ricc. 2164, fo. 42 r°, col. 1-2):

" .....§ Cercando noi trouamo la finale casione. e secondo quello
" ke noi trouamo pare kel corpo delanimale abia similitudine collo
" corpo del cielo especialemente lomo lo quale e piu nobele e em-
" percio li saui kiamaro lomo menore mondo.§ l o g r a n d e a r t i f i o
" f i l o s o f o m i r a c u l o s o del quale e posto kelli entendea leuoci
" deli ucelli e delialtri animali. lo quale stando ello bosco per stasione
" elle grandi montagne per dilecto sonando uno suo strumento. alo-
" quale / suono se racollieno li ucelli eli altri animali de la contradia
" secondo keposto enoi auemo molte uolte ueduto dali Saui deSe-
" gnatori desegnato liquali animali li andauano datorno alegrando
" se e quasi balando e cantando ciaskeduno secondo lo suo uerso.
" l o q u a l e f i l o s o f o e l l e n c o m e n ç a m e n t o d a l a p r i m a
" p a r a u l a d e l s u o l i b r o k i a m o l o m o. M u n d u s s e-
" c u n d u s. e kiamollo mondo secondo acomparatione del mondo
" primo. § li Saui non lavareano kiamato mondo menore.selli non

[1] Lines 15 and 16 (the last two). J. Huemer, *Corpus scriptor. ecclesiasticorum Latinorum*, vol. X, Vindobonae, 1885, p. 15.

" auesse similitudine collo corpo del mondo eli Saui la similiaro al corpo delmondo. noi asemiliamo lioki ale stelle..... ".

Out of this curious paragraph two facts are clear: first, that Ristoro is citing, directly or indirectly, from a Latin form of a work by one whom he considered a wonderful philosopher and whom he called " Artifio " (or " Artefio ", Mss. Chigi and Barberini); — and secondly, that Ristoro, or his source, has confused him with Orpheus.

Three principal questions present themselves: (1) who is the authority thus referred to? (2) what work of his is being cited? (3) how did he become endowed with the attributes of Orpheus? In the ensuing exposition this general order will be followed.

Roger Bacon (1214-92) offers the first clear testimony concerning Artephius [1], in his *Opus Maius* [2], p. 208: " ..... Sed sapientes dediti " experimentali scientiae de his excogitaverunt, non solum moti " propter utilitatem, sed excitati per brutorum animalium industriam, " quae multis modis obviant festinationi moriendi, ut cervus et " aquila et serpens, et multa alia animalia suam vitam prolongantia " per industriam naturalem, sicut auctores scribunt et experientia " docuit. Quorum exemplis excitati crediderunt, quod Deus ipse " brutis hoc concessit ad instructionem hominis mortalis. Et ideo " insidiati sunt animalibus brutis ut scirent vires herbarum et la- " pidum et metallorum et aliarum rerum, quibus sua corpora recti- " ficabant multis modis tanquam miraculosis, sicut ex libris Plinii, " Solini, Avicennae de Animalibus, et Tulli de Natura Divina, ex " philosophia Artephii, et libris aliis et auctoribus variis, certissime " colligitur, et experti sunt multi ".

Ib., p. 209: " Artephius, qui omnes regiones orientis peragravit " propter sapientiam inquirendam, Tantalum magistrum regis Indiae " invenit in aureo throno sedentem, de natura et motibus coelestibus " docentem, cui Artephio idem Tantalus humiliavit se in discipulum " fertur in libro suae philosophiae vixisse multis annorum cente- " nariis per secretas experientias verum ".

Ib., pp. 212-13: " ..... Nam Artephius, qui legitur vixisse mille " viginti et quinque annis, habuit meliorem medicinam quam bu- " bulcus senex, in quo renovata fuit juventus per sexaginta annos. " Liquor ille quem bibit ille rusticus, aestimatur versus aequalita- " tem elementorum / accessisse longe ultra cibos et potus communes;

[1] STEINSCHNEIDER, *Al-Farabi* &c., in *Mém. Acad. Impér. d. Sciences, St. Pétersb.*, VII sér., tome XIII, n° 4, 1869, p. 251; and in *Wien Akad. Sitzungsber.*, (phil.-hist. Kl., vol. 151, 1905, p. 8) thinks Artephius to be identical with the " Artesius " cited by Guil. d'Auvergne († 1249) in *De Legib.*, p. 91: " Artesius magus simul et " philosophus, qui librum scripsit de Virtutibus verborum et caracterum " quoted by JOURDAIN, op. cit., p. 298, n. 3.

[2] Ed. Bridges, Oxford, 1900, vol. II, part. 6 " de Scientia Experimentali, " cap. (follg. cap. XII) de secunda praerogativa scientiae experimentalis, Ex. II ".

" sed tamen multum deficit ab aequalitate plena; gradus enim multi " sunt in accessu ad ultimum aequalitatis; quod etiam non attigit " Artephii medicina, sicut nec illa quae per quingentos annos fecit " illum vivere, qui literam papalem habuit in attestatione tanti mi- " raculi, de quo dictum est superius ".

Ib., p. 213: " ..... Quae vero sunt remedia et quas res accipiunt, " invenitur maxime in libro Secretorum Aristotelis et in philosophia " Artephii, et in libro de Passionibus Senectutis, et in tractatu de " Senum et Seniorum Regimine, et in libris Plinii, et alibi multis " modis ".

Again, elsewhere [1], Bacon says, after mentioning the rustic who had the seal of papal confirmation on his longevity: " Haec etiam " confirmantur per opera animalium, ut cervi, & aquilae, & serpentis, " & multorum, quae per virtutem herbarum & lapidum, suam re- " novant juventutem Et ideo sapientes dederunt se ad huiusmodi " secretum, excitati exemplis brutorum, existimantes quod possible " fuit homini, quod brutis animantibus est concessum. Propter quod " Artefius, sua sapientia secretas vires animalium, & lapidum, & " herbarum, & caeterarum rerum scrutatus, ob secretae naturae " scienda, & maxime propter vitae prolongationem; gloriantur " [margin: *Aliter / gaudet*] se vixisse mille & viginti quinque annos..... ".

Farther on, in enumerating the various methods used to conceal secrets of wisdom " a vulgo ", Bacon says [2]: " ..... Quinto occulta- " verunt quidam per alias litteras quam sunt apud gentem suam, " aut quam sunt apud alias nationes, sed fingunt eas pro sua vo- " luntate; & hoc est maximum impedimentum, quo usus est Ar- " tefius in libro suo de secretis naturae. Sexto fiunt non figurae " literarum sed aliae figurae geometricae, quae secundum diversi- " tatem punctorum & notarum habent literarum potestatem, & istis " similiter usus est Artefius in sua scientia..... ".

Another statement by Bacon about Artephius, which I have not located, is alleged in NAUDE's *Apologie pour les Grands Hommes soupçonnez de Magie*..... [3] " il [Bacon] dit en un autre endroit de ses " œuvres, qu'il [Artephius] étoit encore de son temps en Alle- " magne..... " [4].

[1] *Epistolae* [sic] *Fratris Rogerii Baconis de secretis operibus artis et naturae, e de nullitate magiae* [correct " Epistolae " to Epistola, as in the explicit, p. 861: " *Explicuit Epistola Baconis*..... " &c. " Ad Guilielmum Parisiensem conscripta "], cap. VII, *De retardatione accidentium senectutis, & de prolongatione vitae humanae...*, published in the *Theatrum Chemicum*, vol. V, 1660, pp. 854-61. This quotation is from p. 854.

[2] Caput VIII, *De occultando secreta naturae & artis*, p. 857.

[3] Amsterdam, 1712, p. 257.

[4] Marginal note here has: " *Libr. suae Philoso.* ".

Various have been the theories as to who this Artephius was; *e. g.* [1]: " ARTEPHIUS, philosophe hermétique du douzième siècle, que " les alchimistes disent avoir vécu plus de mille ans, par les secrets " de la pierre philosophale. François Pic rapporte le sentiment de " quelques savants qui affirment qu'Artéphius est le même qu'Apol- " lonius de Tyanes, né au premier siècle, sous ce nom, et mort au " douzième, sous celui d'Artéphius " [2].

Steinschneider [3] identifies him with " the Greek alchemist Ste- " phanos ", *via* the Arabic form of the name: Istafanos [4].

Some authorities have guessed him a Jew [5]; most have limited themselves to calling him an Hermetic Philosopher, dating his time vaguely in the XII century, referring with doubts to his reputed longevity, and handing on the traditional list of works [6]. This list includes: *Clavis Maioris Sapientiae*; *Liber Secretus*; *Speculum Speculorum*; *De Vita Propaganda* [or *Proroganda*]; *De Characteribus Planetarum, Cantu et Motibus Avium, Rerum Praeteritarum et Futurarum Lapideque Philosophico.*

[1] MIGNE, *Encyclopédie théologique*, vol. 48, Paris, 1846, col. 126.

[2] Referring to this citation from F. Pico, NAUDÉ, *Apologie* &c., p. 257, gives in the margin the reference: " *Lib. 2. de praenot., c.* 6 ".

[3] *Zeitschr. d. Deutsch. Morg. Gesellsch.*, XVIII, p. 193; *Mém. de l'Acad. Impér. d. Sciences de St.-Pétersb.*, VII série, tome XIII, nº 4, 1869, p. 166, n. 22 and p. 251; *Monatschr. f. Gesch. u. Wissensch. des Judenthums*, Breslau, vol. 38, 1894, p. 42; *Wien Akad., Sitzungsb.*, phil.-hist. Kl., vol. 151, 1905, p. 8.

[4] Gildmeister's suggestion (v. art. in *Zeitschr. d. Deutsch. Morg. Gesellsch.*, XXX, 1876, p. 538), based on the title of a certain work: that Artephius is the same as Al-Toghrai, does not seem to have borne fruit. Steinschneider mentions G.'s article, and the matter could easily have been settled by an examination of the Arabic Ms. referred to. Gildmeister's statement is: " Bei dieser Gelegenheit möge die Notiz " angeknüpft werden, dass der Artephius, dessen Clavis majoris sapientiae der " König Alphons aus dem Arabischen übersetzen liess und über den zuletzt aus- " führlich Chevreul im Journal des Savans 1867, p. 767 und weiter gehandelt hat, " niemand anders ist, als der bei uns vornämlich als Dichter, im Orient als Alchy- " mist berühmte Al-Toghrai. Das Original ist wahrscheinlich dessen Mefatih " ...&c " H. Kh. V, 4, was sich in Paris, da das Bch in der Nationalbibliothek Catal., " p. 204 n. 974 vorhanden ist, lecht sicher stellen liesse ". — The reference here given to HAJI KHALFA, *Lexicon Bibliog.*, 1852, VI, p. 4, nº 12510, Arabic above, Latin translation below — reads, in the latter: " 12510. Mefatih el-rahmet we " Mesabih el-hikmet, Claves misericordiae et lucernae sapientiae de alchymia, " auctore *Mowayyed-ed-din Hosein Ben Ali Toghrayi Isfahani*, anno 515 (inc. 22, " Mart. 1121) mortuo. Congessit librum e commentario in *El-Romuz*, et libellus " declaratus est cuivis philosopho commendandus ".

[5] E. g.: WOLF, *Bibliothecae Hebraeae*, vol. IV, Hamb. 1733, p. 790:

ארטיפיאוס ARTEPHIVS,

" pro Ex Judaeo venditatur in libro vernaculo: Fegfeuer der Chymisten p. 12, " ibiqve scripto ejus Chymica, satis nota, a perspicuitate laudatur & incomparabilis " appellatur, vita vero ejus longior in dubium vocatur ".

[6] For a list of his bibliographers &c., v. FERGUSON, *Bibliotheca Chemica*, vol. I, 1906, p. 51: to which add the general biog. & bibliog. works by Michaud, Hoefer, &c., and the larger encyclopaedias.

Of these, the *Clavis Maioris Sapientiae* has been found to be the same as the *Clavis Sapientiae* which Alfonso X, King of Castile and Leon (1221-1284), caused to be translated from Arabic into Castilian [1]. The Latin form of this latter work is evidently the original, and the work under the expanded title *Clavis Maioris Sapientiae* is merely a slightly curtailed and corrupted version of the same text. " The work treats 1°, of the Aristotelian elements or qualities, 2° of " the generation of minerals, and 3°, of the generation of plants from " minerals, and of animals from plants. It is a short treatise on " cosmogony, and not on transmutation " [2]. This work seems to have been comparatively little known in the middle ages, though printed several times.

The *Liber Secretus*, which is a sort of alchemists' handbook, was more widely known, and there are numerous editions.

Of the *Speculum Speculorum* I have no other information than the reference in Borel, *Bibliotheca Chimica* [3]: " Eiusd. Speculum " speculorum, incipiens, hoc Mirificum Opus. Ms. ".

I have found no definite mention of the location of any Mss. of the two last-named works; and the same is true of the *De Characteribus Planetarum, Cantu et Motibus Avium, Rerum Praeteritarum et Futurarum, Lapideque Philosophico* [or *Philosophorum*] [4]. But, fortunately, for this we have the very full description and extensive quotations given by Cardanus (1501-96) in his *De Rerum Varietate libri XVII* [5] as a sample of the lengths to which charlatanism can reach. He begins the chapter with the words: " Nemo me existimet " haec scribere, aut quod uera talia fore putem, aut quod res falsas " ad historiam pertinere arbitrer: sed ut quilibet intelligat, quibus " rebus uana gentilitas fidem habuit..... ".

A little farther on he comes to the matter in question [6]: " Itaque " magicae stultitiae maximi in ea arte Artefij subiiciantur placita, " ut non solum dolosos, set etiam mentecaptos magos fuisse diiudices. " Huius igitur proposita fuerunt octo, quae omnem foelicitatem pol-

[1] Ferguson, op. cit., vol. I, p. 51 and p. 24. — Chevreul made the discovery and treats of the work at length in *Journ. d. Savants*, 1867, p. 767 sqq.; 1868, p. 45 sqq., 153 sqq., 209 sqq., 644 sqq. — In the first article, p. 768, he speaks of him as " un alchimiste arabe du nom d'Artefius, que l'on fait vivre au XII[e] siècle, parce " qu'il cite Avicenne qui vécut de 980 à 1036, et qu'à son tour il est cité par Roger " Bacon, &c. "; I have been unable to find out where he " cites Avicenna ".

[2] Ferguson, *Bibl. Chem.*, I, 24.

[3] S. v. Artephius, p. 33.

[4] The *Bibliog. Gén. de l'Astron.*, vol. I, p. 729, n° 4124, however, not only cites this work, but credits it with having been printed, viz.: " 4°, Francofurti, 1615? ". — I have sought diligently for information about this edition; everyone I have consulted is of the opinion that it was never printed.

[5] Avinione, 1558. — Lib. XVI, cap. XC: " Ars Magica Artefii et Mihinii ", pp. 786-98.

[6] P. 787.

" licentur. Ea breuibus uerbis proponam. / Primum, / Docet cha-
" racteres planetarum, annulorum & sigillorum. / Secundum, / Motus
" auium quid significent. / Tertium, / Voces earum ac animalium in-
" terpretari, ac sortes proiicere. / Quartum, / Docet uirtutes herbarum.
" / Quintum, / Lapidem philosophorum. / Sextum, / Docet scire prae-
" terita, praesentia & futura, per tria uasa. / Septimum, / Demonstrat
" experimenta propria, tum faciendi, tum cognoscendi. / Octauum,
" / Declarat uirtutem producendi uitam ad multa secula ".

After this summary, Cardanus begins to transcribe. The " Cha-
" racteres " [1] are cabalistic scrawls, arranged in three sets and di-
vided among the seven planets. Of them Cardanus says in part [2]:
" Hi igitur sunt characteres, dolosa mente excogitati: quorum uir-
" tutem nullam esse, certum est... At ne nomina putes aut Arabica
" aut Chaldaea aut Hebraea aut Graeca..... Igitur figmenta mera
" esse oportet..... ".

The next treatise is described at some length; I select the fol-
lowing extracts: —

" Secundum, Deinde motus auium sic descripsit, dicens: si cornix
" ante te uolat, significat tempus futurum: si a latere dextro, praesens:
" si post terga, praeteritum, malum semper..... si supra te descendens
" uolauerit, erit supra inimicos tuos autoritas tua..... " [3]. Then by
using dice-like stones in certain ways the voices of birds may be
gathered and interpreted: — " nam cum vox fit ex aere, ab aere
" etiam excipitur eius proprietas: calculi autem iactantur in aere,
" igitur a calculis demonstratur " [4]. The stones are variously treated
to collect various voices; and a ring is made for the ringfinger. Another
method " cognoscendi uolucrum uoces: & dixit, pone aliquid ex ra-
" dice mandragorae & piretri in ambas aures, & habeas in annullari
" sinistrae manus annulum ferreum cum gemma, ex pice & folium
" pini in ore, & uirgam ferream cum aculeo aureo in dextra, cum quo
" pungat folium quod in ore habet cum uocem auis audit, & subito
" intelliget " [5].

Next is a short citation of what Artephius " dixit de herbis rem
" sane ridiculam..... "; and then " docuit, lapidem philosophorum ad
" aurum faciendum..... / ..... cuius operatio est facilis, si alta ascen-
" dere poteris " [6] ..... this very briefly too. This is the fifth of the
eight parts.

Next is the doctrine of past, present, and future; which will be

[1] Pp. 788-89.
[2] P. 790.
[3] P. 790.
[4] P. 791 (misnumbered 691).
[5] P. 792.
[6] Pp. 792-93.

seen to be the source of Ristoro's quotation. Cardanus introduces this as follows [1]:

" Postmodum docet praeterita, praesentia & futura, *dicens primo* " sic, In Dei beneficiis acquirendis, omnes secundum quod bonum est " aut malum a secreto eius ortum habent: qui licet diuersis tempo- " ribus diuersa distribuat, omnia tamen partitur aequaliter, licet ho- " mini aliter uideatur: de cunctis igitur tam bonis quam malis, " gratias ei agere tenemur. P o s t e a s u b i u n g i t : M u n d u s " s e c u n d u s a primo cognoscitur, quia quod infra spacium suum " operatur medietas, illud idem infra minoris spatij metam operatur " aequalitas. Postmodum dixit, numerus uniuscuiusque a seipso ha- " betur: nam cum homo oritur, illo temporis momento elementa per- " miscentur communicantia omnibus reliquis partibus elementorum " usque ad coelum, unde cunctorum fit particeps ". Cardanus com- " ments: " Haec tria certe praecepta, inter tot uanitates admirabilia " sunt ". The method of reading past, present, and future events is then described (— though in the same work, it seems to have little connection in thought with the preceding): three vessels are used, one of earthenware, or of silver, one of copper, and one of glass. These were to be filled with various liquids and arranged in various orders; and many magic methods and formulas were to be used, according to section seven, to carry out thirteen " experimenta ". The description of these ended, Cardanus comments: " Haec ille. Quidnam " stultius excogitari potest? " [2].

Lastly, he describes the contents of the eighth part [3]: " Post haec " etiam posuit uirtutes quarundam herbarum, quarum proprietas " est ad expellendum demones, ad faciendum aurum, ad prolon- " gandum vitam, usque dum dixerit, Artefium uixisse annis 1025. " ad suscitandum mortuos, denique ad omnia ea peragenda quae in " solius Dei sunt potestate ".

At the end of this Chapter [4] Cardanus tells where he saw this work: " Hanc tamen historiam inueni in libro antiquo, pulcherrimis " characteribus scripto, ex charta hoedina quam pergamenam uocant. " Et in eodem erant Euclidis data, quae postmodum in lucem pro- " dierunt, sed uix post octoginta annos. Aderat etiam Campani liber " de circulis..... ".

Ristoro's citation " mundus secundus " [5] is, therefore, from a work, or part of a work, whose title was approximately [*Liber*] *Rerum Praeteritarum* [, *Praesentium*] *et Futurarum* [6]. The words " Mundus

[1] P. 793.
[2] P. 797.
[3] P. 797.
[4] Pp. 797-98.
[5] V. supra, p. 36.
[6] V. supra, pp. 39, 40, 41.

" Secundus " may well have been, as Ristoro states, at the very beginning of the work [1]; for the introductory paragraph given by Cardanus [2] may easily be due to some pious scribe or compiler. Whether the work as Ristoro knew it was divided into sections called in the Latin " Parabolae ", is not evident, but may be considered probable, because of the unusual word " paraula " which he uses in this connection.

It must be noted, further, that Ristoro refers to this work as *the* book of Artephius; so that he evidently did not know of the other parts included in the collection described by Cardanus. This would explain why Ristoro says: " e p o s t o kelli entendea leuoci deli " ucelli e delialtri animali " [3]. — And it seems fairly clear that the *Rerum Praeteritarum et Futurarum* of our traditional title was indeed a separate treatise: these words are not in syntactical construction with the rest of the title; and the text of this section, as described by Cardanus, has nothing to do with that of the others.

Briefly, then: the words " Mundus secundus " quoted by Ristoro, are derived from the beginning, or at least near thereto, of the first section (probably called " Parabola ") of a work teaching divination of past, present, and future by means of three vessels; which work corresponded to parts six and seven of the collection described by Cardanus. Ristoro apparently knew only indirectly of Artephius as an adept in the understanding and interpretation of bird-voices.

What the exact reason is for Ristoro's failure to distinguish between Artephius and Orpheus, is an extremely puzzling problem; and behind it may lie some startling facts concerning the Middle Ages' conception of both of the latter. The only evident link is the characterization of Artephius as being a wonder-worker who understood the voices of birds [and animals?].

There can hardly be any doubt that Ristoro's description of Artephius applies to Orpheus with his wonderful lyre as depicted in pagan and early Christian [4] art. It will certainly not be imagined

[1] " ellencomençamento della prima paraula ", v. supra, p. 36.

[2] V. supra, p. 42.

[3] V. supra, p. 36.

[4] Cfr., e. g., this description of a painting on the ceiling of S. Domitilla (Rome, II cent.) which I excerpt from A. HEUSSNER, *Die altchristlichen Orpheusdarstellungen*, Leipzig dissertation, Cassel, 1893, p. 2: " In der Mitte..... Orpheus auf " einem Felsstück..... Auf dem..... linken Bein ruht die fünfsaitige Leier, in deren " Saiten der Sänger mit beiden Händen spielend greift..... Von beiden Seiten be- " grenzen diese Felspartie Baumgruppen, auf denen sich ausser einer grösseren " Anzahl kleinerer Vögel zur rechten Seite des Sängers ein Pfau erkennen lässt. " Von anderen Tieren zeigt das Bild noch Löwe, Fuchs, Pferd, Widder, Schaf, " Schlange, Schildkröte und Maus..... ". — Giotto's relief representing Music, on the campanile at Florence, is an interesting presentation of Orpheus among the

that any such representation of Artephius had been " molte uolte " ueduto dali Saui desegnatori desegnato ". As to where Ristoro saw it " posto ", any number of Latin texts might have served; in fact hardly any myth was more widely spread. Ovid, of course, occurs to our minds first [1]. Elsewhere a common tradition made Mount Olympus the scene of this concert [2] " elle grandi montagne ". Ristoro apparently, develops his description of Orpheus' audience a little unduly, to make it fit his " e posto kelli entendea leuoci deli ucelli " e delialtri animali ", when he ends with " cantando ciaskeduno " secondo lo suo uerso ".

CONCLUSION.

Summing up the main results of this study:

Of the eighteen separate citations of authors, by name, in the *Composizione del Mondo* (two being elsewhere repeated), four are certainly indirect, viz.:

1. The two separate references to Ptolemy are derived from Alfragan.

2. The reference to Abu Mansur is also from Alfragan.

3. The reference to Sedulius is taken — with a mistaken estimate of its value — from Isidore of Seville.

So far as the scope of this paper extends, therefore, Ptolemy, Abu Mansur, and Sedulius are eliminated.

It seems certain that Ristoro used directly the folloiwng works:

1. Alfragan, *Liber de Aggregationibus Scientiae Stellarum* — translation of Girard of Cremona. Of this work he shows an intimate and extensive knowledge.

2. Zahel, *Introductorium de Principiis Judiciorum.* With this he may have had but a superficial acquaintance; as he quotes only from the first paragraph.

birds and animals. The larger birds have their wings thrown back, as if beating time with them.

[1] *Metamorphoses*, X, 86 sqq.: " Collis erat, collemque super planissima campi " /Area, quam viridem faciebat graminis herbae: / Umbra loco deerat. Qua post- " quam parte resedit / Dîs genitus vates, et fila sonantia movit; / Umbra loco " venit..... ". 143 sqq.: " Tale nemus vates contraxerat: inque ferarum / Concilio " medius, turba volucrumque sedebat. / Ut satis impulsas tentauit pollice chordas; " / Et sensit varios, quamvis diversa sonarent, / Concordare modos; hoc vocem " carmine rupit..... ": XI, 1-2: " Carmine..... tali silvas, animosque ferarum / " Threicius vates, et saxa sequentia ducit..... "

[2] E. g. HYGINUS (ca. B. C. 30), *Poeticon Astronomicon*, II, 7 (Chap. on Constellation of Lyra): " Orpheus, ut complures dixerunt, in Olympo monte, qui Mace- " doniam dividit à Thracia: sed, ut Eratosthenes ait, in Pangaeo sedens, cum cantu " delectaretur, dicitur Liber ei objecisse Bacchas ".

It is probable that in addition he knew at first hand the following:

1. Isidore of Seville, *Origines sive Etymologiae.*

2. Artephius, [*Liber*?] *Rerum Praeteritarum* [, *Praesentium*] *et Futurarum.*

3. Albumasar, *Introductorium Maius*, translation of John of Seville.

It is possible that he utilized directly:

1. Aristotle, *De Coelo et Mundo* — whether in a Latin < Arabic translation or in the Latin < Greek version. The latter is the less likely, however, as it was not extant more than twenty-one years, at the utmost, before Ristoro *finished* the *Composizione del Mondo* (1282); secondly, because of the weight of probability that he got his information, if directly from Aristotle at all, through a text which was coupled with Averroes' Commentary — and it was a Latin < Arabic version which was regularly so circulated.

An alternative supposition about as probable as his use of Aristotle is that Averroes' Commentary was itself the source of his information about Aristotle.

2. Averroes' Commentary on Aristotle *De Meteoris.*

However, the fact that Ristoro so unhesitatingly contradicts both Aristotle and Averroes in the matters concerning which he cites their opinions, makes one loath to believe that he had a first-hand knowledge of either of those great authorities. This attitude of reserve is further justified, *a priori*, by the conviction that there must have been numerous secondary sources from which he could have drawn, — for no authorities were more widely quoted than these two.

3. Avicenna, *Liber Canonis.* — But the opinion under consideration in this case may have been derived secondarily, through Averroes, or possibly from a (lost?) treatise on a pseudo-Ptolemaic *Liber de Divisione Locorum Habitabilium* or *de Dispositione Sphaerae.*

There is no cogent reason for believing that the compilations of Albertus Magnus or Thomas Aquinas were known to Ristoro.

In general, it is interesting to note that in all the cases studied, excepting Isidore of Seville — and just possibly Aristotle — Ristoro's information was derived from Latin translations of Arabic works.

The ground is thus broken for a more comprehensive study of the sources of Ristoro d'Arezzo's *Composizione del Mondo.*

The next step would be to examine the numerous cases in which he quotes the opinions of " i Savi ", or, as often, of " tutti i Savi ".

BIBLIOGRAPHY.

I. Ristoro d'Arezzo, *Composizione del Mondo* — Mss. and editions:

1. Biblioteca Riccardiana, Florence, Cod. 2164 [xiii or xiv cent.]. — Parts printed by:
   a) V. Nannucci, *Manuale della Letteratura italiana*, 2 ed. Florence, 1858. — Vol. II, pp. 192-205, prints: Bk. I, Chapters 1, 2, 15; Parte 4, Chap. 3; " Destinzione " 8; Chap. 4; Chap. 19 (These are reprinted by Narducci — ed. below — pp. lxix-lxxix; cfr. also lxxx sq. for " un confronto fra il detto Codice e la stampa del medesimo Nannucci ").
   b) A. Bartoli, *Storia della Letteratura italiana*, Florence, 1880. — Vol. III, pp. 325-45 reproduces diplomatically Bk. I, Chapters 1-12.
   c) G. Amalfi, *Il primo libro della composizione del mondo di Ristoro d'Arezzo dal Ricc.* 2164, Naples, 1888. " Centocinque esemplari, non venali ". One facsimile of Ms.
   d) E. Monaci, *Crestomazia italiana dei primi secoli*, Città di Castello, 3 fascicoli, 1889, 1897, 1912. — Fasc. II, pp. 362-68 prints: " Encomenzisi..... "; Bk. I, Chapters 1, 2, 15; " Destinctione " 6, Parte 4, Chap. 3; " Dest. " 8, " Capitolo delle vasa antiche ".
   e) Wiese & Percopo, *Geschichte der Italienischen Litteratur*, Leipzig & Vienna, 1899. — Facing p. 56 is facsimile of a page of Ms. (end of Bk. I beginning of Bk. II).
   [*f*) Padre Guerrino Fraccalvieri, Rettore del Convitto di Moncalieri, is preparing an edition of the complete text of Ricc. 2164; to be published under the auspices of the Società Filologica Romana].
2. Biblioteca Barberini, Rome, Codex XLVI, 52 (xiv cent.)*
3. Biblioteca Chigiana, Rome, Codex M. VIII, 169 (xv cent.). Printed by:
   a) E. Narducci, *La Comp. del Mondo di Ristoro d'Arezzo, testo italiano del* 1282, Rome, 1858; do. 1859; pp. 173-317 have a " Riproduzione esatta (salvo le abbreviature) dell'esemplare chigiano M. VIII, 169 ".
   b) Camerini, *Composizione del Mondo*, Milan, 1864. — Based on Narducci's edition.
4. Biblioteca Magliabechiana, Florence, Codex " Classe XI, Palchetto 7, num.136 " già Strozziano, num. 491 " (date 1480)*.
5. Biblioteca Riccardiana, Florence, Codex 2229 (xv cent.). — Contains only 19 full chapters of Bk. I; ends in chapter 20 with the words: " & potemo " dire s'o una uia che ifiumi eschono del mare & entrono nel mare cioe ritor- " nano nel mare ".

Above Mss. are described in detail by Narducci, ed. cit., pp. x-xxxi.

II. Works on Ristoro.

[I regret that so many of the works to be mentioned in this section have been inaccessible to me. It is hardly probable that any of the present discussion of sources was anticipated in the works I have been unable to consult, for otherwise the accruing results would have been noted by the modern historians of Italian literature — cfr. Gaspary's statement [1], in speaking of Ristoro and his work.....:

[1] *Storia della Letteratura Italiana*, tradotta..... da N. Zingarelli, vol. I, Torino, 1887, p. 158.

" le sue conoscenze derivano parte dagli antichi, da Tolomeo, Aristotele, Isidoro, " parte da traduzioni latine di scrittori arabi, Averroe, Avicenna, Algazel, Al- " fergan, che cita egli stesto ". — Cfr. also D'Ancona and Bacci[1]: " L'opera sua... " meriterebbe esser studiata pel suo intrinseco valore, rispetto alle conoscenze " cosmografiche del medio evo: di che piccol cenno è in una dissertazione del " Fontani (negli *Atti dell'Accad. della Crusca*, vol. I, p. 191) e in un opuscolo di " D. Comparetti, *Intorno alla Composiz. del Mondo di R. d'A.* (Pisa, Nistri " 1859) "]:

1. F. Fontani, *Sopra un vecchio inedito testo a penna di Ser Ristoro d'Arezzo.* — Read before the Accademia della Crusca, April 11, 1815; published in *Atti dell'Accad. della Crusca*, Vol. I, p. 191 sqq. — Reprinted by Narducci, ed. cit., pp. LVI-LXV.
2. B. Boncompagni, *Intorno ad un'opera di Ristoro d'Arezzo*, Rome, 1850.*
3. D. Comparetti, *Intorno alla Composizione del Mondo di Ristoro d'Arezzo*, Pisa, 1859.*
4. D. Nardo, *Studj filologici su la Composizione del Mondo di Ristoro d'Arezzo*, testo del secolo XIII, pubblicato da E. Narducci, Venice, 1861.*
5. A. Mussafia, review of Narducci's edition, in *Jahrbuch für Romanische und Englische Literatur*, Vol. X, 1869, pp. 114-127.
6. Id., *Scritto intorno alla Composizione del Mondo di Ristoro d'Arezzo* Leipzig, 1869.*

* An asterisk accompanying a title indicates that I have not seen the work cited.

III. Sources.

A) General works, Bibliographies, etc., [in alphabetical order. — Only those actually mentioned in this paper are listed].

1. Albertus Magnus, *Opera omnia*, cura ac labore Augusti et Æmilii Borgnet, 38 vols., Paris, 1890-1899.
2. Chevreul E., *Examen critique d'un écrit alchimique intitulé " Artefii Clavis majoris sapientiae "*, in *Institut de France, Académie des Sciences, Mémoires*, Tome XXXVI (Apr. 1867), Paris, 1870, pp. 27-82.
3. Id., *Du traité Alchimique d'Artefius intitulé Clavis maioris sapientiae*, in *Journal des Savants*, 1867, pp. 767-84; ib., 1868, pp. 45-59, 153-57, 209-24 644-55.
4. Delambre M., *Histoire de l'astronomie du moyen âge*, Paris, 1819.
5. Ferguson J., *Bibliotheca Chemica*, Glasgow, 1906.
6. Gildmeister J., *Alchymie*, in *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, XXX, 1876.
7. Haji Khalfa, *Lexicon Bibliographicum et Encyclopaedicum.....* Latine vertit... G. Fluegel, London, 1835-58, 7 vols.
8. Haskins C. H., *The Translations of Hugo Sanctelliensis*, in *Romanic Review*, vol. II, nº 1, Jan.-Mar., 1911.
9. Heussner A., *Die altchristlichen Orpheusdarstellungen*, Dissertation, Univ. of Leipzig, Cassel, 1893.
10. Hoefer J. C. F., *Nouvelle biographie universelle...*, 46 vols., Paris, 1852-66.

[1] *Manuale della Letteratura Italiana*, vol. I, nuova ed., Firenze, 1906, p. 198.

11. Id., *Histoire de la chimie*, 2 éd., 2 vols., Paris, 1866-69.
12. Houzeau & Lancaster, *Bibliographie Générale de l'Astronomie*, Brussels, vol. I, Pt. 1, 1887; Pt. 2, 1889; vol. II, 1882.
13. Hyginus C. J., *Poeticon Astronomicon.* in A. van Staveren, *Auctores Mythographi Latini*, Lugduni Batavorum, 1742.
14. Jourdain A., *Recherches critiques sur l'âge et l'origine des traductions latines d'Aristote...* Nouv. éd. revue et augmentée par Charles Jourdain, Paris, 1843.
15. Michaud & Michaud, *Biographie universelle*, 45 vols., Nouv. éd., Paris, 1842-65.
16. Migne, *Nouvelle encyclopédie théologique*, 51 vols., Paris, 1851-66.
17. Naude G., *Apologie pour les grands hommes soupçonnez de magie*, Amsterdam, 1712.
18. Renan J. E., *Averroès et l'Averroïsme*, 9 ed., Paris, 1882.
19. Roger Bacon, *Opus Majus...*, ed. by J. H. Bridges, 3 vols., Oxford, 1900.
20. Id., *Epistola de secretis operibus artis et naturae et de nullitate magiae*, in *Theatrum Chemicum*, 2 ed., 6 vols., Argentorati, 1659-61, vol. V, 1660.
21. Steinschneider M., *Ueber die Mondstationen (Naxatra), und das Buch Arcandam*, in *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, XVIII, 1864.
22. Id., *Al-Farabi (Alpharabius), des arabischen Philosophen Leben und Schriften*, in *Mémoires de l'Académie impériale des Sciences de St.-Pétersbourg*, VII^e série, Tome XIII, n° 4, St. Petersburg, 1869.
23. Id., *Die arabischen Uebersetzungen aus dem Griechischen*, in *Centralblatt für Bibliothekswesen*, Beiheft 12, Leipzig, 1893.
24. Id., *Pseudo-Juden und zweifelhafte Autoren*, in *Monatsschrift für Geschichte und Wissenschaft des Judenthums*, vol. 38, Breslau, 1894.
25. Id., *Die europäischen Uebersetzungen aus dem Arabischen bis Mitte des* 17 *Jahrhunderts*, in *Sitzungsberichte der philosophisch-historischen Klasse der Kaiserlichen Akademie der Wissenschaften*, vol. 149, Wien, 1905, IV Abhandlung; vol. 151, 1905, I Abhandlung.
26. Thomas Aquinas (St.), *Opera Omnia...*, Antwerp, 1612, 21 vols.
27. Id., *Opera Omnia*, jussu impensaque Leonis XIII P. M. edita, 12 vols., Rome, 1882-1906.
28. Toynbee P., *Dante's Obligations to Alfraganus in the Vita Nuova and Convivio*, in *Romania*, XXIV, July, 1895, pp. 413-32.
29. Wolf J. C., *Bibliothecae Hebraeae*, Hamburg, 1715-33, 4 vols.

B) Texts:

1. Albumasar, *Introductorium Majus*, Biblioteca Laurenziana, Florence; Plut. XXIX, Cod. XII: " Liber Introductorii Maioris in Magisterio " scientiae astrorum editione Abumasar, & interpretatione Iohannis Hi- " spalensis ex Arabico in Latinum, in octo Tractatus divisus. Inc. *Laus* " *Deo qui creavit caelum & terram cum omnibus quae in eis sunt mirabilibus* " *suis.* Des. *quod Luna esset ibidem.* Tum repetitur titulus hoc pacto: *Per-* " *fectus est Liber Introductorii Maioris in magisterio scientiae astrorum,* " *editione Abumasar, & interprectatione Iohannis Hispalensis ex Arabico* " *in Latinum, sub laude Dei, & eius auxilio.* Codex membranac. Ms. in 4. " Saec. XIV. binis columnis, & minutis, breviatisque characteribus exa- " ratus. Constat foliis scriptis 108 ".
2. Id., *Introductorium in Astronomiam Albumasaris Abalachi VIII continens libros partiales*, Aug. Vin., 1485, 1489, 1495; Venetiis, 1490, 1506, 1515.

3. Id., *Flores* [*Tractatus Florum*] *Astrologiae*, Venetiis s. d.; Aug. Vin., 1488, 1495; Venetiis [1515].
4. Id., *De Magnis Conjunctionibus, Annorum Revolutionibus ac eorum Profectionibus, VIII continens Tractatus*, Aug. Vin., 1489; [Venetiis] 1503, 1515.
5. Alfragan, *Liber de Aggregationibus Scientiae Stellarum*, Biblioteca Laurenziana, Florence; Plut. XXIX, Cod. IX: " Ameti Liber Aggregationis " Scientiae Stellarum. Liber aggregationis scientiae stellarum, & de prin- " cipiis caelestium motuum, quem Ametus composuit filius Tometi, qui " dictus est Alfagranus, triginta continens Capitula. Post Capitum tabulam " Liber inc. *Numerus mensium anni Arabum, & aliorum omnium est* " 12 *menses*. Des. *quod sufficit intelligenti, & in hac arte valenti. Explicit* " *Liber Alfagrani*... Codex membranac. Ms. in 4. min. Saec. xiv. Constat " foliis scriptis 22 ". Printed in:
6. Alfragano, *Il ' Libro dell'Aggregazione delle Stelle '... secondo il Codice Mediceo-Laurenziano, Pl.* 29, *Cod.* 9, *contemporaneo a Dante*... Pubblicato con introduzione e note da Romeo Campani, Città di Castello, 1910. — In *Collezione di Opuscoli Danteschi inediti o rari* diretta da G. L. Passerini.
7. Id., same work: Bodleian Library, Oxford: Codex Digbeianus 215; the fifth work in the Ms.; beginning on fo. 46 b: " *Liber de aggregationibus scientie* " *stellarum et principiis celestium motuum quem ametus filius ameti qui* " *dictus est alfagranus compilauit triginta continens capitula*" — then follows table of contents & in middle of col. 2, ib., begins text (after chapterheading: " Capitulum primum de annis arabum et aliorum omnium): " *Numerus mensium anni arabum et aliorum omnium est.* 12, *menses* ". Ends, fo. 57 r°, col 2: " *Jam ergo declarauimus de eclipsibus solis et lune quod sufficit intelligenti Expletus est liber ameti alfagrani in scientia astrorum* ".
8. Id., Brevis et perutilis Compilatio *Alfragani* astronomi peritissimi totum id continens quod ad Rudimenta Astronomica est opportunum, Ferrariae, 1493; — under title: *Rudimenta Astronomica*, Norimbergae, 1537; — under title: *Compendium id omne quod ad Astronomiae Rudimenta spectat complectens*, Parisiis, 1546.
9. Id., Muhamed Alfraganus, *Chronologica et Astronomica Elementa, a Palatinae Bibliothecae veteribus libris Latine versa, explicata et scholiis exposita*; ed. J. Christmann, Francofurti, 1590, 1618.
10. Id., Muhamed filius Ketiri Ferganensis, *Elementa astronomica*. Arabic text, with Latin translation by J. Golius, Amstelodami, 1669.*
11. Aristotle, *Aristoteles Graece ex recensione Immanuelis Bekkeri*. Edidit Academia regia Borussica, Berolini, 1831, 2 vols.
12. Id., v. infra, n° 13.
13. Aristotle and Avicenna, *Omnia Aris opera cū Cōmēto Auerrois*. Impressa Venetijs Accurate ac Diligenter per Bernardinum de Tridino de Monteferato. Anno a Natali Christiano. m.cccc.lxxxviii j. Nonis. Septembribus. 2 vols. [1s 2d ed., of ed. princeps of 1483].
14. Artefius, [*Liber*] *Rerum Praeteritarum* [, *Praesentium*] *et Futurarum* (?) extensive excerpts in Hieronymi Cardani Mediolanensis, Medici, *De Rervm Varietate Libri XVII*. A prima editione ab ipso denuo authore recogniti..... Avinione, mdlviii.
15. Avicenna, *Avicennae medicorum Arabum principis, Liber Canonis, de Medicinis Cordialibus, et Cantica*....., Basileae, 1556.
16. Id., *Avicennae Canonis Medicinae translatum a Mago. Gerardo Cremonensis* [sic]. Biblioteca Laurenziana, Florence, Cl. XV, Cod. 84, Formerly at Bibl. Nazionale (Magliabechiana).

17. Isidore of Seville, *Isidori Hispalensis episcopi Etymologiarum Libri XX*, in *Corpus Grammaticorum Latinorum veterum*, ed. Lindemannus, Tom. III, Lipsiae, 1833.
18. Sedulius, *Sedulii Opera Omnia, rec..... Johannes Huemer*, in *Corpus Scriptorum Ecclesiasticorum Latinorum*, Vol. X, Vindobonae, 1885.
19. Zahel, *Introductorium de Principiis Judiciorum*, in *Liber quadripartiti Ptholomei &c.* — a collection of astrological works, of which the fifth part is entitled: *Zahel*, " De interrogationibus; ejusdem De electionibus; " ejusdemque De temporum significationibus in judiciis ". Venetiis, 1484, 1493, 1519.
20. Id.: same work; Biblioteca Laurenziana, Florence; Plut. XXX, Cod. XVII: " Zehelis Introdvctorium in Astronomiam..... Inc. *Scito quod signa sunt XII.....* Des. *non errabitis in depositione Regis, si Deus voluerit*, " *Explicit Zehel Bebrit Israelita.....* Codex membranac., Ms. in 8, Saec. xiii. " Constat foliis scriptis 71 ".

VITA.

I was born July 24, 1876, in Erie, Pa.; of Frank Augustin, and Clara Ann (Mooney) Austin. After attending the Erie High School, I entered Princeton in 1896, and received the degrees of A. B. (1900) and A. M. (1901). I was classical Fellow in Princeton (1900-1); and have held instructorships in Latin, French or Italian, at Princeton (1901-2, 1903-6), at Amherst College (1908-9), and at the Johns Hopkins University (1910-11). From 1906 to 1908, and from 1909 to 1910, I was a graduate student of Romance Languages at the Johns Hopkins University, with French as Principal Subject, and Italian and Spanish as Subordinate Subjects. The summer of 1901 and the year 1902-3 were spent in study in Italy.

At the Johns Hopkins University I have followed courses under Professors Elliott, Bloomfield, Armstrong, Marden, Shaw, Warren, Ogden, and Keidel; to all of whom I wish to express my thanks. To Professor Shaw, in particular, I am indebted for guidance and aid in the preparation of the present work.

University of Michigan.

HERBERT DOUGLAS AUSTIN.

CONTENTS

Introduction ..... *Page* 3

I. Aristotle ..... » 4
II. Averroes ..... » 10
III. Alfragan ..... » 12
IV. Ptolemy; Abu Mansur ..... « 14
V. Alfragan (continuation) ..... » 17
VI. Avicenna ..... » 28
VII. Albumasar ..... » 30
VIII. Zahel ..... » 33
IX. Isidore of Seville ..... » 35
X. Sedulius ..... » 36
XI. Artephius ..... » 36

Conclusion ..... » 44

BIBLIOGRAPHY ..... » 46

Vita ..... » 51